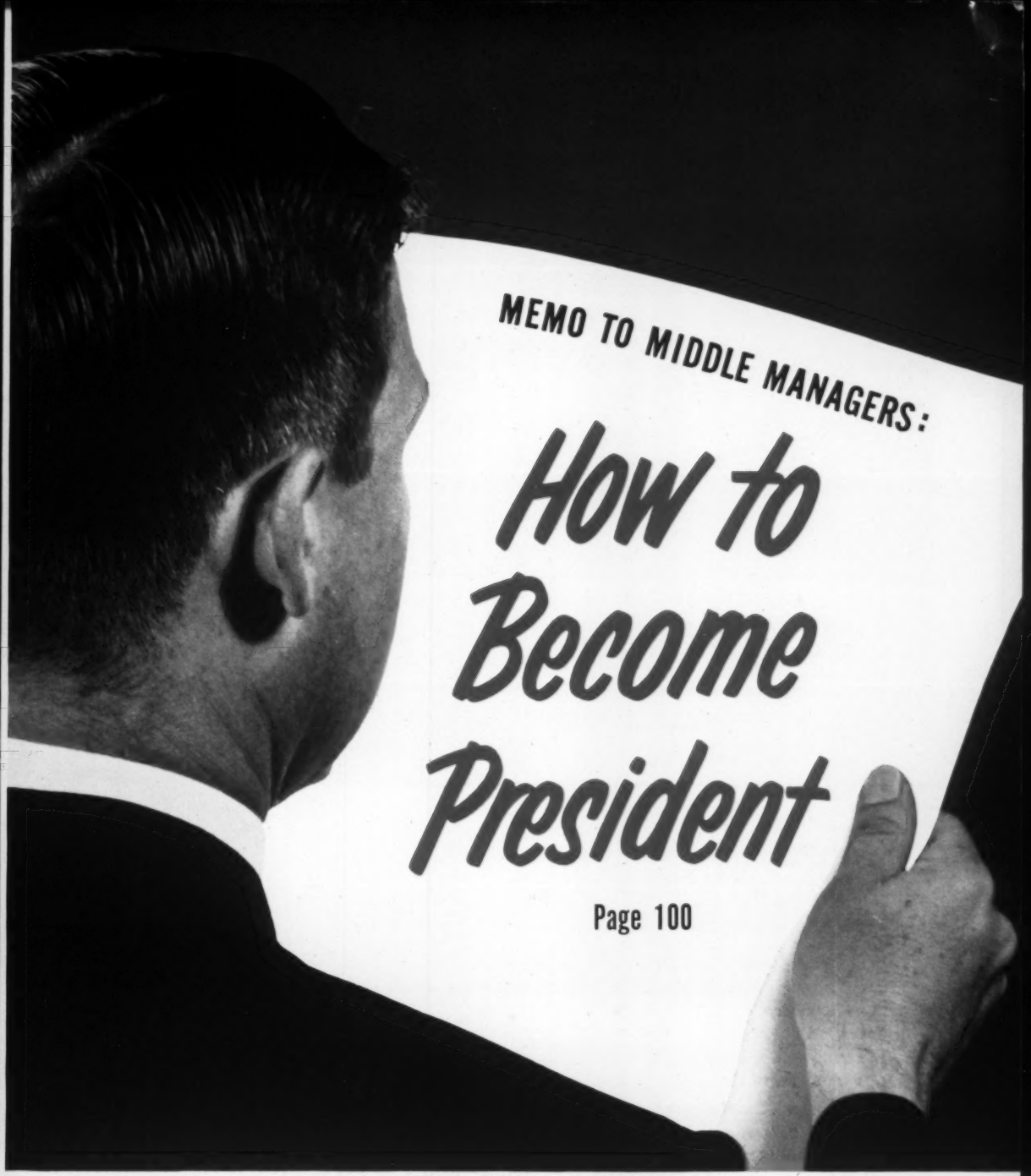
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
SEPTEMBER 25, 1961



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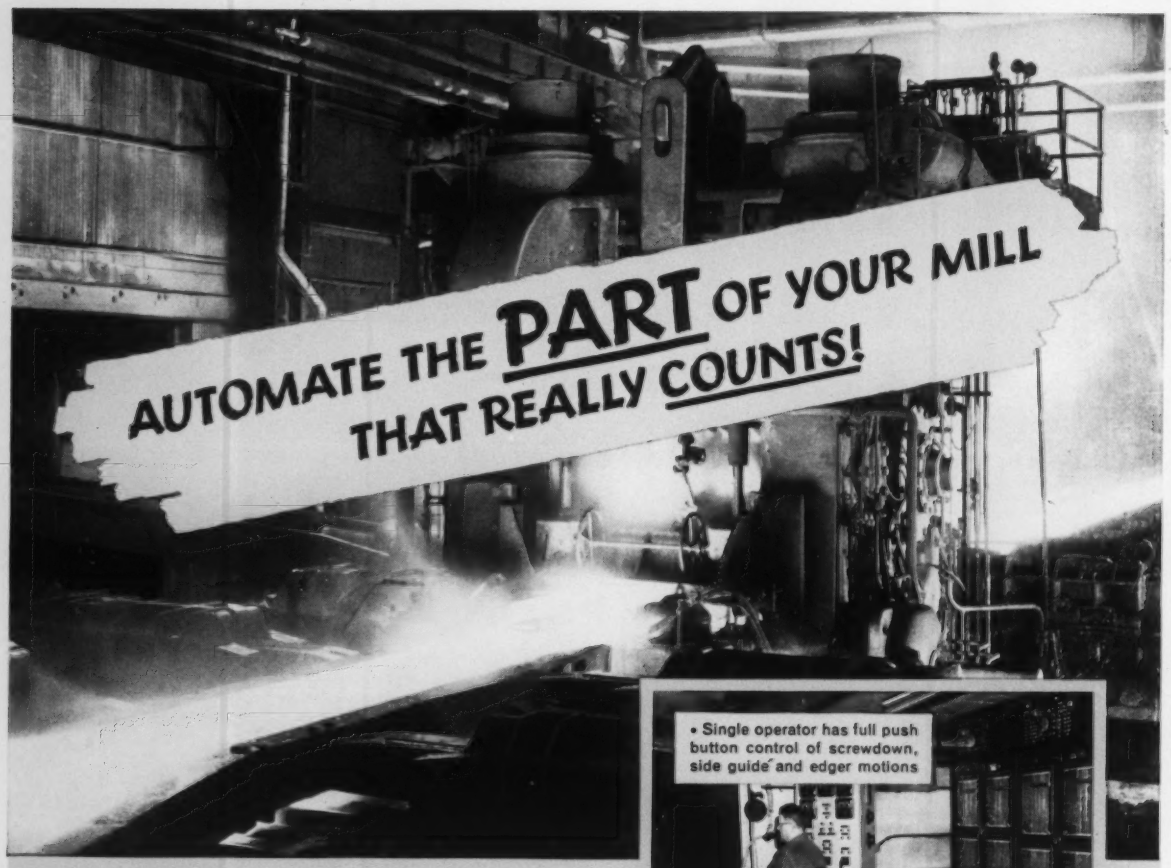

You can cut initial investment in HALF -- save on maintenance, too!

Is complete automation of your mill really necessary? EC&M has built automatic screwdown systems for dozens of existing mills, which are giving excellent results at low cost. We are continuing to supply systems which improve results with just one operator in the pulpit.

With the EC&M method, a single push button positions screwdown, side guides and edgers automatically for each pass. No need to memorize rolling schedules...no inaccurate roll settings... the roller's task is greatly simplified. Better quality of rolled product is assured with equal or better output at a low initial expenditure—less than half the cost of completely automating all mill movements. Moreover, the regular maintenance crew can do all servicing...no special personnel training or extra manpower needed.

EC&M Engineers will be glad to study your requirements and recommend the equipment required to give effective results, economically.

7 years of successful rolling at Granite City Steel
Since it was installed at Granite City Steel seven years ago, the EC&M automatic screwdown system shown above has maintained consistent high quality and output. A single roller operates all motions of this mill, and his efficiency stays at a peak throughout a turn. There is less operator fatigue, physical or mental. In seven years, there have been no production bottlenecks, no delays.

Write **FOR DETAILS** • *Ask for Bulletin & Progress Report 6550. Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio*

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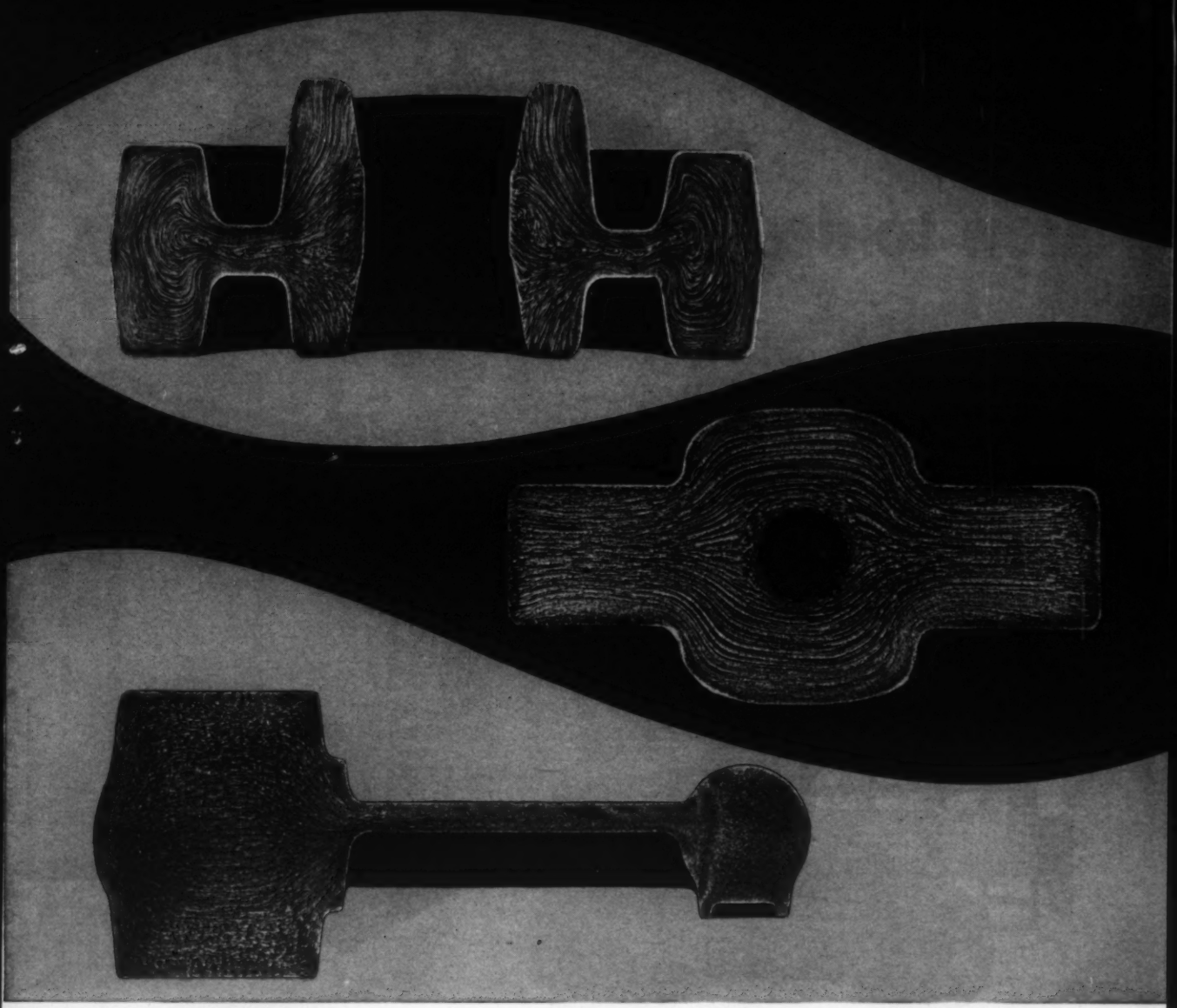


Only FORGED *parts have flow lines like these*

When quality steel forgings are cut in half, polished, etched, and dyed, you can see one reason for their great strength. The grain structure shows how the forging process has "worked" added strength into the steel. Note how the grain follows the contour of the forgings, placing the greatest strength where it is most needed.

FORGED STEEL IS SOUND STEEL

Forged steel has strength without undue bulk. It's economical because it saves many costly machining and fabricating operations. Forging improves the steel's mechanical properties, adds to its service life.

SOUND STEEL "MAKES" THE FORGING

No one knows better than the forger that *the quality of the steel is a forging's most important ingredient.* That's why so many forgers use Bethlehem steels—carbon and alloy grades they can always rely on to meet their requirements. You'll find you can rely on them, too.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Export Sales: Bethlehem Steel Export Corporation

Steel *for Strength*
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL

How to design a 30% lighter body

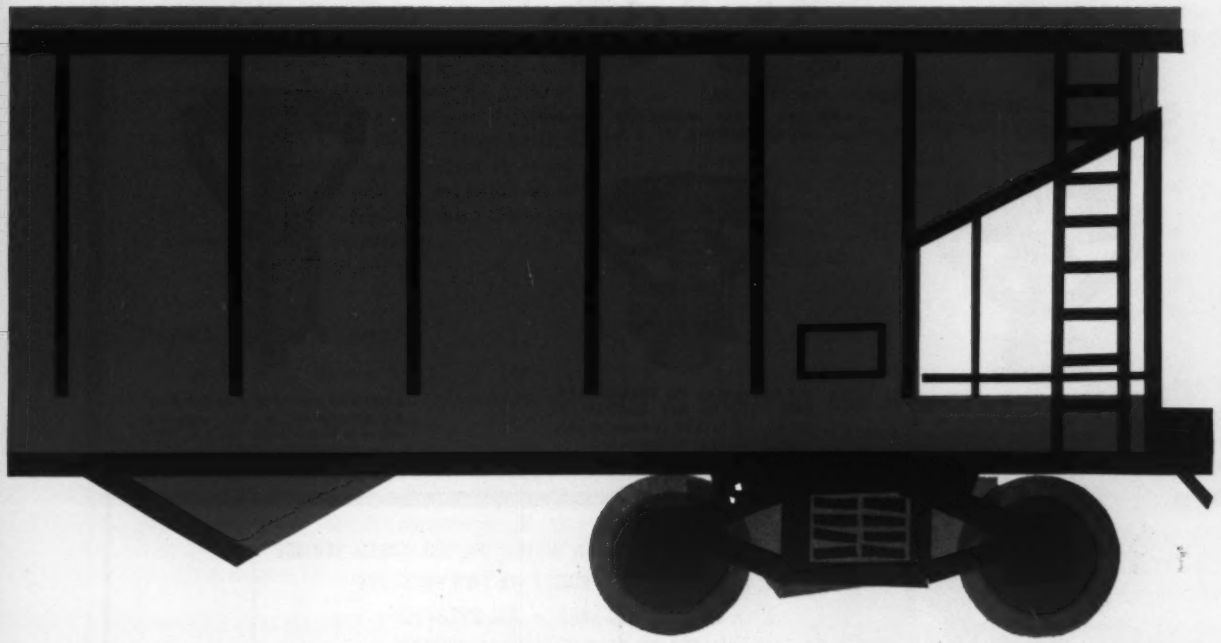
Here is a 70-ton hopper car that has yet to be built . . . but dramatic savings in weight at a nominal material cost can be made by designing it with USS "T-1" type A Constructional Alloy Steel Plate and USS Quenched and Tempered "T-1" type A Structural shapes now available.

Save 8,250 pounds of steel! A standard 70-ton capacity hopper car body fabricated in high-strength low-alloy steel and carbon steel plates and shapes normally weighs approximately 28,000 lbs. According to a special design study, the substitution of USS "T-1" type A Steel in certain components can result in a weight savings of about 8,250 lbs. The material cost for this design utilizing USS "T-1" type A plates and structurals, based on mid-1961 prices, is only $230 more than the present conventional hopper car. This means that a slight increase in the total cost of the steel itself can accomplish a significant weight reduction of 8,250 lbs.—nearly 30% of the existing body weight. Of greater importance is the potential 6% increase in over-all lading capacity realized through this savings in weight. Additional savings could be expected in hopper cars of greater capacity.

Greater payload offsets initial cost. Every pound of dead weight transported by a railroad is done so at the expense of a pound of potential payload per trip made during the life of a car. With

This mark tells you a product is made of modern, dependable Steel.

with USS "T-1" type A Steel



additional lading capacity, greater payloads possible would quickly offset the small additional steel cost involved. USS "T-1" type A Steel's minimum yield strength of 100,000 psi permits its use in thinner sections with accompanying weight reduction. Secondary benefits which accrue through the use of this exceptional constructional alloy steel include improved abrasion resistance, greater ability to withstand impact, and lower maintenance costs. All of these factors promote longer, economical service performance.

Our new quenched and tempered structural alloy shapes are now available in USS "T-1" and "T-1" type A Steels in the more commonly used sizes of wide flange (CB's) and American Standard beams, channels, equal angles and unequal angles.

For more information on USS "T-1" and "T-1" type A Steels, or on the new USS Quenched and Tempered Structural Shapes, write United States Steel, Room 6387, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS and "T-1" are registered trademarks.

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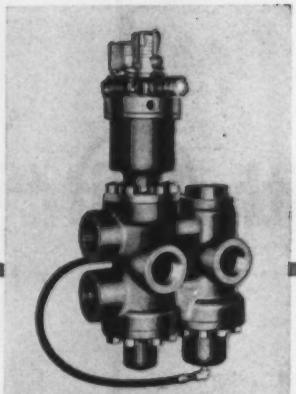
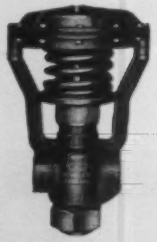
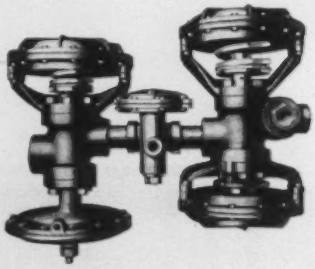


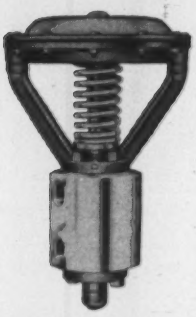
3,000 PSI, 4-WAY SEMI-AUTOMATIC air operated, handles oil, water, glycol-base fluids, 1 - 2 in. NPT.



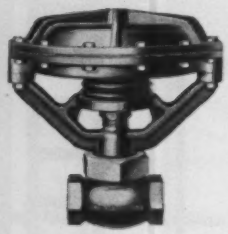
300 PSI, 3-WAY OR REVERSE ACTING bridge yoke, triple-guided stem, ¼ - 3 in. NPT.



4,000 PSI, 3-WAY AUTOMATIC 2-pressure, auto-neutral, throttling, ½ - 3 in. NPT.

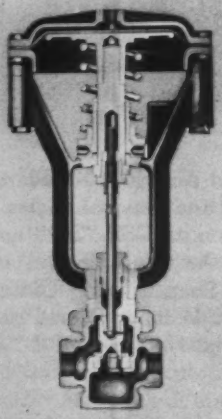


4,000 AND 6,000 PSI, 2 AND 3-WAY BALANCED NC or NO, pressure above or below seats, ½ - 2 in. NPT.



150 AND 300 PSI, DIRECT ACTING globe body, top-guided stem, ¼ - 3 in. NPT.

150 PSI, 3-WAY OR REVERSE ACTING, ¼ - 3 in. NPT **VACUUM, 2-WAY,** 1 - 3 in. NPT compact design, positive sealing, bridge yoke.



250 PSI, 2-WAY V-PORT MODULATING controls temperature, pressure or flow, direct or reverse acting, ½ - 2 in. NPT.

FOR HOT OR COLD RAW WATER, OIL, AIR, STEAM SERVICE
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HIGH OR LOW PRESSURE • AIR OPERATED
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For application engineering recommendations, contact your nearby Sinclair-Collins field engineer.

For more information, write for Bulletin SC-59. Address The Sinclair-Collins Valve Company, Akron 11, Ohio, Dept. ST 961.

The SINCLAIR-COLLINS VALVE Co.

DIVISION OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)
AKRON 11, OHIO

Memo to You

Bill Dean, news editor, is the author of this week's cover story, "Memo to Middle Managers: How to Become President," on Page 100. We don't guarantee that reading it will make you the next president of your company, but it may help.

One year after joining STEEL in 1953, Bill was transferred to Chicago where he covered that important metalworking area until 1959. For nearly two years now, he has been news editor, directing news gathering activities in every area. He got his training in journalism with the *Willard* (Ohio) *Times*, the *Oberlin* (Ohio) *Times*, and as a student at Ohio University.

Prone to be Prone

A nationwide survey by U. S. Steel Corp.'s American Steel & Wire Div. gives evidence that people are prone to be prone.

As a large producer of wire for inner springs, the division tried to determine to what extent the country is on the recline. The survey reveals that about 180 million people in the nation own 181 million mattresses. Almost 1 out of 5 is a lumpy 15 or more years old. Less than half the old mattresses are thrown away when new ones are purchased. More than one-third are passed on to someone else. A whopping 41 per cent of the museum pieces go to children in the bone-forming 1 to 12 age group.

Typxwritxr Troublx

Here's a message from *MHI News*, a publication of the Material Handling Institute:

"Xvxn though my typxwritxr is an old modxl, it works quitx wxll xxcxpt for onx of thx kxys. Thxrx arx 46 kxys that function wxll xnough, but just onx not working makxs thx diffxrxncx.

"An association is somx likx my typxwritxr—not all thx pxople arx working propxrly. You may say: 'I am only onx pxrson, I won't makx or brxak a program.' But it doxs makx a diffxrxncx bxcausx an association program to bx xffxctivx nxxds thx participation of xvxry pxrson."

MHI News goes on to point out that the broken key message has been making the rounds for some time. Although its original source is unknown, its continuing validity is obvious. For example, one vote can make a tremendous difference in an election. The publication points out:

"One vote in the electoral college made Thomas Jefferson, Thomas Quincy Adams, and Rutherford B. Hayes presidents of the U. S."

Not only does the MHI typewriter write x for e, it also types Thomas when it means John.

Incidental Intelligence

Item: The secret of the Spartans' military supremacy was steel weapons. That's the theory of Dr. Lyle B. Borst, nuclear physicist, as reported by the American Iron & Steel Institute.

Item: This is the recent comment by a company president: "The 1962 market is going to be what it is going to be because our country is what it is and because it is different now from what it has been."

Captions for Geraldine

We're a little concerned about Geraldine, cleaning woman and our night editor. She is showing insufficient regard for corporate images. The editors get many pictures that are stockpiled. Here is one that Geraldine wrote a caption for, in complete disregard of the original.

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EVER SIT ON A CONCRETE BENCH

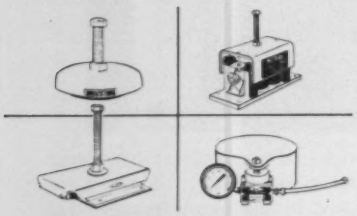
WITHOUT A CUSHION?

The longer you sat on it . . . the more you wished you had a cushion, didn't you? And remember how you felt every little vibration from those passing trucks?

Precision manufacturing equipment feels vibration too, but it can't get up and move away very easily — particularly when it's lagged down to a concrete foundation! Machine tools simply show their discomfort by higher reject rates or continuous maintenance problems.

What's the answer?..SERVA-LEVL® Mounts . . . a new concept that floats precision machinery on columns of air! Even ultra-precision, numerically controlled machines no longer require special, *costly* foundations. And, SERVA-LEVL Mounts *automatically* keep your machines *absolutely level* . . . as precise as 50 millionths of an inch per foot under the shifting load conditions of a long-bedded lathe.

If your machine tools are bothered by vibration, or if you want layout flexibility, no-shim leveling, reduced maintenance, and cost reduction . . . write for your copy of Bulletin 60-04B, "Practical Considerations When Installing Machinery."



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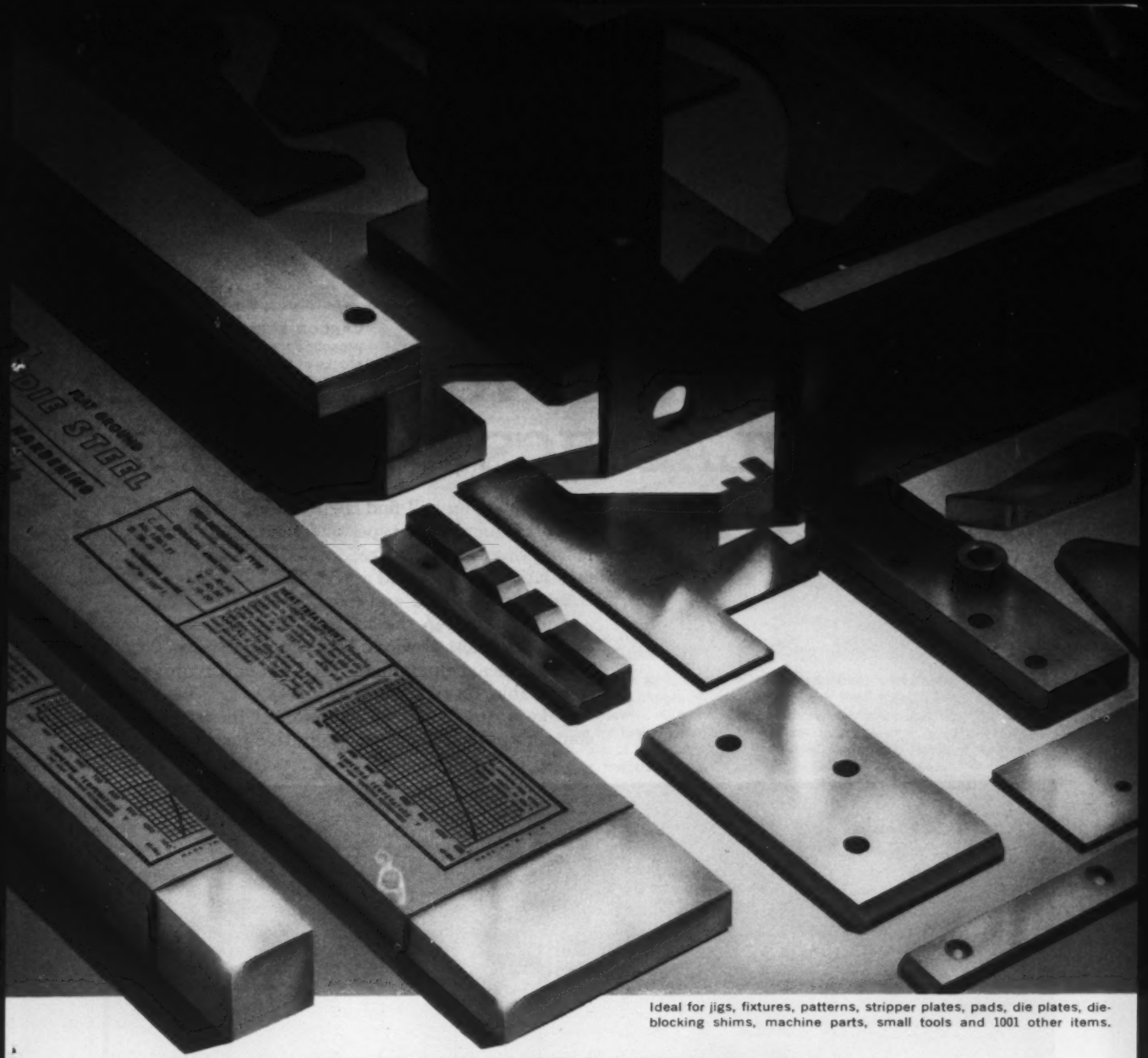

Ideal for jigs, fixtures, patterns, stripper plates, pads, die plates, die-blocking shims, machine parts, small tools and 1001 other items.

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Means BIG Savings on Parts Like These

Imaginative metalworkers in many branches of industry are finding new economies in buying bar steel already finished to close tolerances. The fact is: for thousands of applications *it costs far less* to begin with Simonds high quality, precision-ground tool and die steel than to do the milling and grinding yourself.

What's more, you get a better piece of steel to start with. Dimensionally accurate, parallel and square. Spheroidize-annealed to make it more uniformly machinable, drillable, filable, sawable. And an extra smooth surface finish for easy layout.

Available in "1001" stock sizes — flats and squares — and 3 analyses. Think of the jobs you can use them on. Then check our prices and figure your savings in machining and grinding time and expense.

Oil Hardening (01 Analysis) for general use and average production runs. Spheroidize-annealed, easy to heat treat, standard 18″ and 36″ lengths.

Air Hardening (A2 Analysis) contains 5% chrome for extra wear resistance and long production runs. Spheroidize-annealed, standard 36″ lengths. 18″ lengths also available.

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Send for free "Data Book" listing all sizes, prices, chemical analysis, heat treatment and general information.

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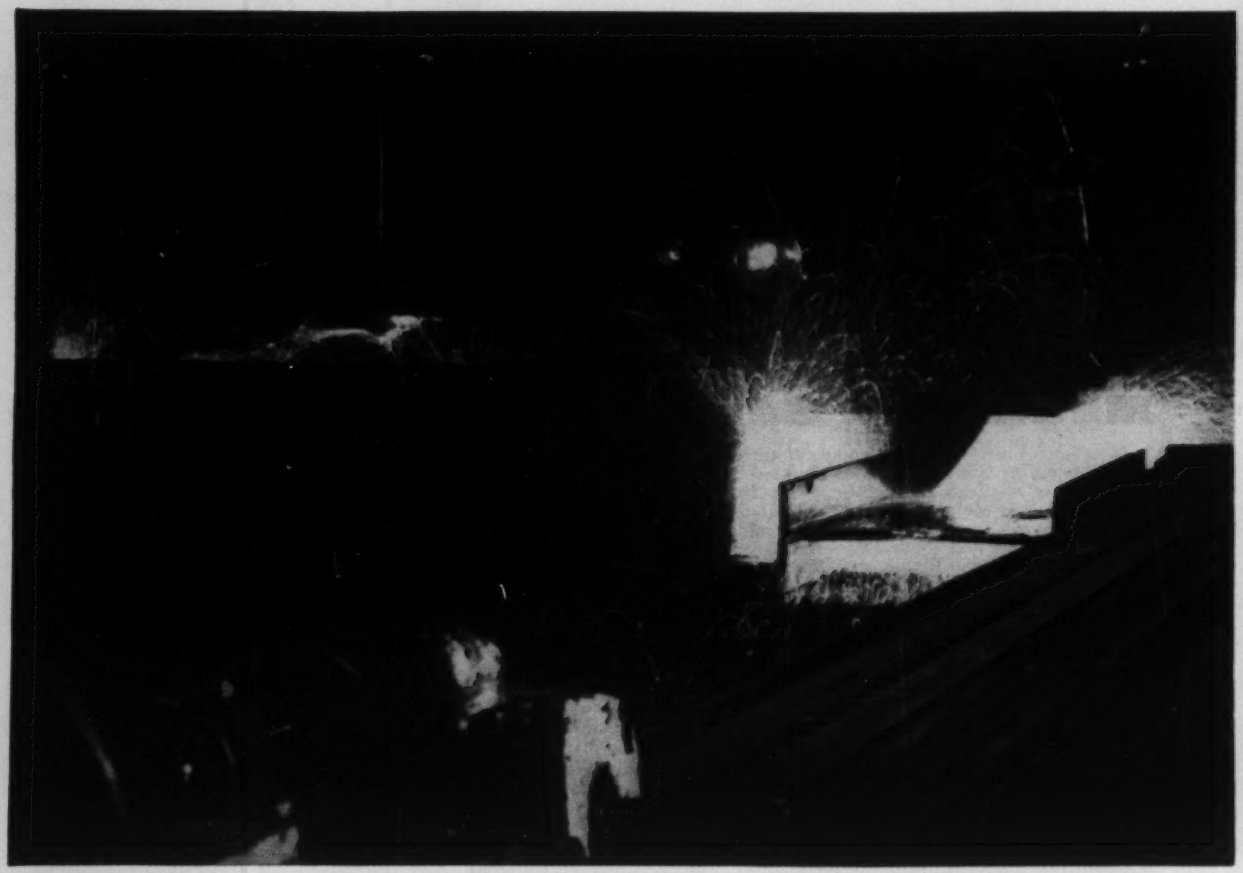
CARBON STEEL—No one even approaches the size and diversity of our stocks of hot rolled bars, plates, structurals. Published tolerances assure the industry's most exacting sawing, shearing and flame-cutting.

At Ryerson you will find the broadest selection of steel and aluminum in all types and sizes—plus plastics and machinery. Thus, you're assured of unbiased recommendations on material and metal-fabricating machines to speed production and reduce costs.

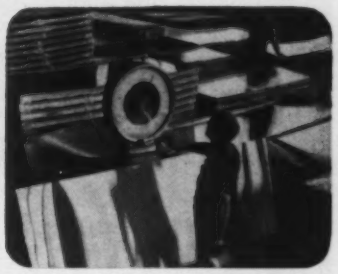
And backing up the size and diversity of stocks are these important services: certified quality controls; expert technical help; industry's closest cutting tolerances; dependable, on-time delivery.

Take a quick tour of Ryerson on these pages, then contact your Ryerson representative for details.

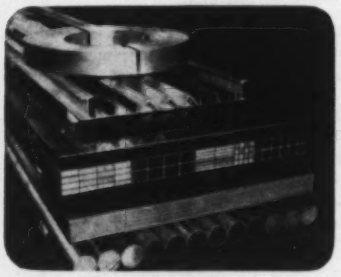


TUBING & CF BARS—Tubing: seamless and welded mechanical; structural; hydraulic cylinder & fluid line; Ledloy® 170. Bars: shafting, machinery steel, accuracy and screw stock, including fast-machining Ledloy 375 and 300.

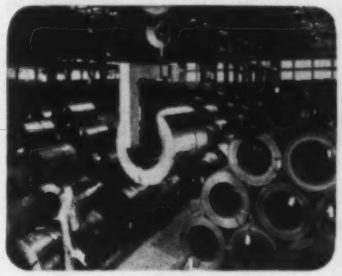
ALLOY STEEL—8-step certified quality program assures riskproof alloys—case-hardening, direct-hardening heat-treated alloys; leaded alloys, including fast-machining Rycut® steels; aircraft quality alloys; etc.



STAINLESS STEEL—2351 sizes, shapes, types and finishes in sheets, plates, bars, tubing, pipe and fittings, etc. All certified to meet ASTM, SAE, military, DuPont or GE specifications. Check in for fast stainless service.



ALUMINUM—Nation-wide service on Reynolds aluminum includes all mill products: sheets, plates, tubing and pipe; wire rod and bar; structural and extruded shapes; construction products for buildings and highways.



SHEET & STRIP—More than 20 kinds of stock sizes—or we can cut sheets to your order with latest shears, slitters and cut-to-length lines for faster service. Also strip coils, etc. Call us for all your sheet and strip requirements.

INDUSTRIAL PLASTICS—Ryertex-Omicron PVC pipe, tubing, sheet and rod conquer more than 281 corrosives. Also rigid Kralastic and flexible polyethylene pipe and Ryertex® laminated phenolic resin plastics.

This big friction saw bites through a 24" beam in less than 12 seconds. The accuracy of Ryerson cutting on all types of equipment is the closest in the industry.

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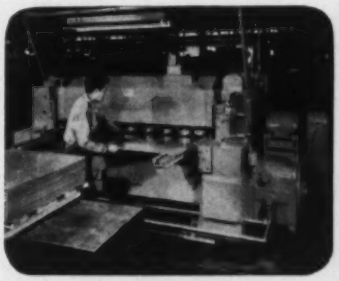

MACHINERY—More than 3800 types and models of metal-fabricating equipment for bending, braking, drilling, forming, hoisting, pressing, punching, rolling, sawing, shearing, threading and welding.

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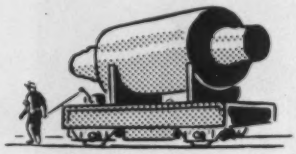
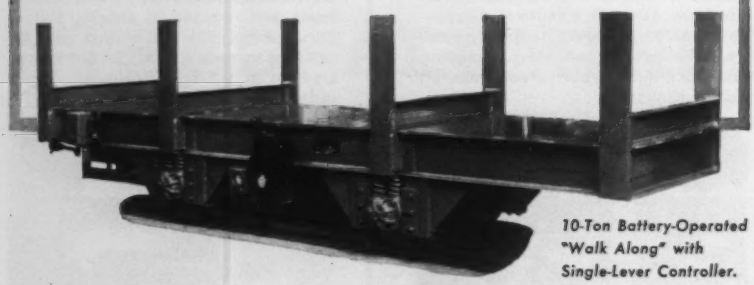
Safety-type Transfers





10-Ton Battery-Operated "Walk Along" with Single-Lever Controller.

ATLAS "walk-alongs" handle your big loads with BIG savings

Altas Safety-Type Transfers are custom designed in any capacity, with single or double-end platforms or for popular "walk-along" service. Safe because there is only one control lever and the car moves only when the operator holds lever.

Battery Operated Roll Transfer Car

SPECIAL FEATURES . . . Deck and cradle arrangements designed for load-handling convenience. Optional power includes Storage Battery • Gas-Electric • Diesel-Electric • Cable Reel AC • Cable Reel DC • Cable Reel AC with fluid coupling • also remote control with no trailing cable.

Request Bulletin 1283

ATLAS CAR & MFG. COMPANY

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CALENDAR
OF MEETINGS

Sept. 27-28, **American Die Casting Institute Inc.:** Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Oct. 1-5, **Electrochemical Society Inc.:** Fall meeting, Statler Hilton Hotel, Detroit. Society's address: 1860 Broadway, New York 23, N. Y. Executive secretary: Robert K. Shannon.

Oct. 3, **Hoist Manufacturers Association:** Meeting, Statler Hilton Hotel, Cleveland. Association's address: 1 Thomas Circle, Washington 5, D. C. Executive secretary: Joe H. Peritz.

Oct. 4-6, **American Machine Tool Distributors' Assn.:** Fall meeting, Penn-Sheraton Hotel, Pittsburgh. Association's address: 1500 Massachusetts Ave. N.W., Washington 5, D. C. General manager: James C. Kelley.

Oct. 4-6, **American Society of Mechanical Engineers:** Process industries conference, Shamrock Hilton Hotel, Houston. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Oct. 4-8, **Porcelain Enamel Institute:** Annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 1145 19th St. N.W., Washington 6, D. C. Managing director: John C. Oliver.

Oct. 5-7, **American Ceramic Society Inc.:** Refractories Division meeting, Bedford Springs Hotel, Bedford, Pa. Society's address: 4055 N. High St., Columbus 14, Ohio. General secretary: Charles S. Pearce.

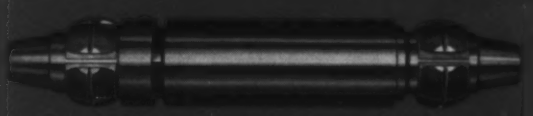
Oct. 5-8, **American Society of Industrial Designers:** Annual meeting, Ambassador Hotel, Los Angeles, and St. Catherine Hotel, Santa Catalina Island. Society's address: 15 E. 48th St., New York 17, N. Y.

Oct. 7-10, **Conveyor Equipment Manufacturers Association:** Annual meeting, Ponte Vedra Inn, Ponte Vedra, Fla. Association's address: 1 Thomas Circle, Washington 5, D. C. Executive vice president: R. C. Sollenberger.

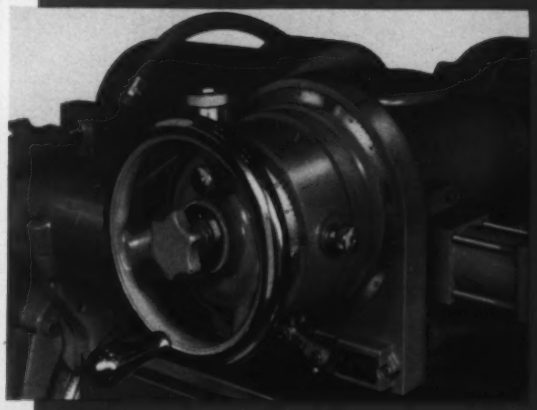
Oct. 8-11, **Systems & Procedures Association:** International systems meeting, Statler Hilton Hotel, Cleveland. ISM address: P. O. Box 6175, Cleveland 1, Ohio. Secretary: Lawrence L. Melick.

Oct. 12-15, **National Screw Machine Products Association:** Fall meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

NEW Landis Type R Universals will improve your grinding accuracy, speed setups

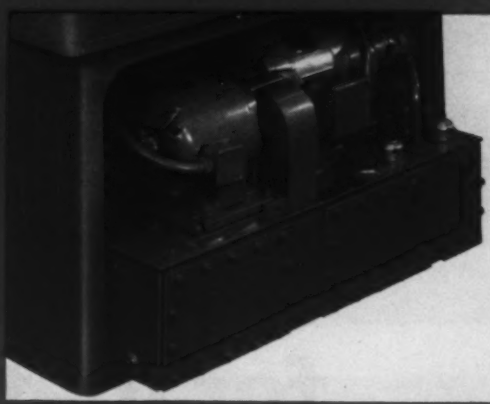


Exclusive Landis Microsphere wheel spindle bearings submerged in circulating and filtered oil. Large diameter spindle has constant and self-adjusting end thrust.



New hydraulic plunge feed available with turning handwheel to show rate and amount of feed during the grinding feed cycle.

New Landis 14" x 36" LR Universal Grinder



Improved machine alignment through better temperature control. Hydraulic oil tank, pump and motor are isolated from bed.

condensed specifications

	10" R	14" LR
max. work swing	10 31/32"	14 3/4"
length between centers	24"	36"-48"
std. grinding wheel	12" x 1"	14" x 1½"
work speeds, rpm (variable)	55 to 495	25 to 500
traverse speeds, ipm	2 to 240	2 to 240
wheel drive motor	2 hp	3 hp

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for metallurgical versatility

Only when you *cast* steel can you capitalize on the limitless possibilities of the world's most versatile metal. Steel castings can take jarring abuse and grinding abrasion. Searing heat and glacial cold. Thermal shock and corrosive attack.

Casting with steel offers the designer the sure path to follow in making components that withstand punishing service conditions. It is the most economical, most direct way of utilizing steel's inherent strength, toughness, dependability.

Consult your steel foundryman. Discover how you can obtain the steel you want, in the shape and exact alloy you need . . . with optimum economy, strength and design freedom.

Ten of these intricate steel castings make up the compactor's 67-inch diameter grid roller. Heat-treated to over 300 Brinell hardness, they provide the abrasion resistance and strength required for high speed road work.

metallurgical versatility plus

FUNCTIONAL DESIGN . . . metal where you need it.

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BENEFICIAL GRAIN STRUCTURE . . . assures optimum multi-directional strength.

DIMENSIONAL UNIFORMITY . . . consistent duplication of the part.

SHOCK RESISTANCE . . . for shock and impact resistance in compression, tension, torsion and shear.

SERVICE STABILITY . . . resists deflection and deformation of parts.

CAST-WELD & COMPOSITE FABRICATION . . . permits economical joining of single castings, or fabricating with other materials.

PROCESS FREEDOM . . . can be readily hot or cold pressed, brazed, plated, coated, and many other process operations.

END-COST ECONOMY . . . steel castings are ideal when all cost factors and customer satisfaction are considered.

Advantages of steel castings and complete engineering information are detailed in the STEEL CASTINGS HANDBOOK. Send the coupon for information about this 680-page book.

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Steel

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It's true, storage problems don't come in standard sizes. That's why you'll find Republic METAL LUMBER® invaluable in arriving at just the kind and size of storage racks or framing you need!

Measure the space you have to work in, cut Republic METAL LUMBER to fit. Assemble it in place with standard bolt and nut fasteners . . . and just that easily you have "custom-made" equipment, tailored to your exact needs.

Republic METAL LUMBER is easy to work with—as completely adaptable as common lumber, and even more convenient to assemble. Need work benches? Build them with Republic METAL LUMBER. Need a ramp, or a ladder? Build it with Republic METAL LUMBER.

A stock on hand will save you time and money, in quick answers to special equipment needs. Easy to store . . . comes to you in bundles of 10 pieces in 10-foot or 12-foot lengths, complete with fasteners . . . delivered by your Republic-Berger warehouse. Call, or mail the coupon for the Republic METAL LUMBER "idea" book.

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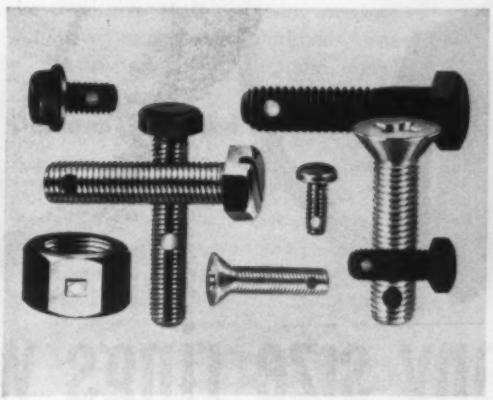
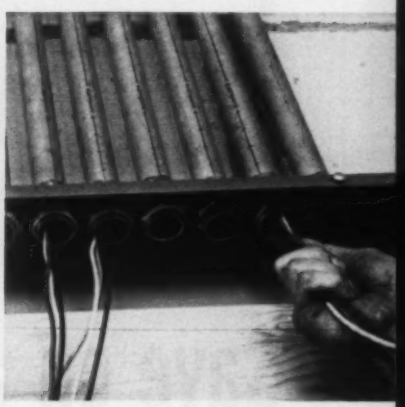
REPUBLIC STEEL LOCKERS. Big, roomy, clean, well ventilated—planned for convenience. Bonderized steel for longest service life. Coupon will bring literature.



REPUBLIC BOLTS AND NUTS, a complete supply source for fasteners of every type and size—quick delivery of your needs in any quantities. Use coupon for literature on standards and specials.



REPUBLIC ELECTRUNITE® E.M.T. ELECTRICAL METALLIC TUBING has cost-saving installation advantages that make it possible to install *in the next larger size* at no greater cost than threaded conduit. It's the economical way to provide extra wiring capacity to meet tomorrow's greater electrical needs. Data supplied through your Republic distributor, or send coupon.

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Save on any size rings with Amweld

Amweld makes flash butt-welded rings in diameters of four inches to eight feet and offers ring customers a sizable cost reduction in every case. Amweld rings save on metal, because rings are formed to or near finished dimensions. Amweld rings save on machining, because the metal is left out—not hogged out. Important to you, Amweld can flash weld rings from almost any metal alloy, common or exotic.

Savings to all Amweld customers totaled over one million dollars last year. One Amweld customer saves by using Amweld rings as gear blanks. Another saves by using Amweld rings as tank flanges. A third saves on rings for jet engine applications. It doesn't cost a thing to think on paper with Amweld. So let us quote you for your cost comparison. Write today: The American Welding & Manufacturing Co., 801 Dietz Road, Warren, Ohio.

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STEEL
The Metalworking Weekly

Metalworking Week®

September 25, 1961

Signs of Our Economic Times

The gross national product is running at an annual rate of $526 billion this quarter, reports Commerce Secretary Luther Hodges. In the second quarter, the annual rate was $516 billion. Other indicators: August personal income (seasonally adjusted rate) was $419.3 billion vs. $405 billion the same month a year ago; housing starts in August were at an annual rate of 1.3 million; new orders of durable goods manufacturers in August were 2 per cent over July's; corporate profits in the second quarter hit an annual rate of $45 billion, $5.5 billion over the first quarter pace.

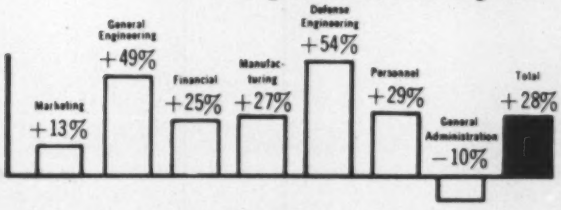
Steel Founders Expect Boost in Shipments

Second half shipments of steel foundries will be substantially ahead of the first half pace, predicts W. H. Moriarty, president, Steel Founders' Society of America (SFSA). In a survey taken for SFSA's annual meeting this week in Hot Springs, Va., 73 per cent of the founders polled forecast an increase in shipments; 19 per cent expect no change; 8 per cent look for a decline. Most promising markets for the $900 million-a-year industry: Railroads, defense, automotive, construction equipment, and chemical.

Executive Demand Rebounds to Four Year High

Demand for executives this summer reached a level as high as any since May, 1957. Heidrick & Struggles, Chicago executive recruiting firm, which measures demand on the basis of situations wanted ads, says the June-August demand was up 28 per cent compared with the like 1960 period. The firm notes that demand for executives jumped sharply in May, rebounding from the low of late 1960.

Percentage of Change in Demand
June-Aug. 1961 from June-Aug. 1960



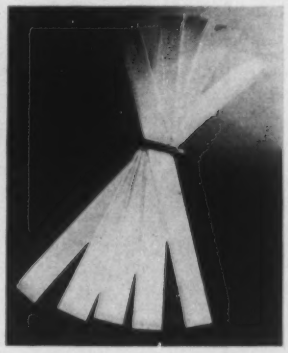
Metalworking Gains Forecast for '62

Next year will be a record one for the economy and for metalworking, declared a panel of economists before last week's annual forecast session of the Cleveland Chapter, American Marketing Association. Inflation will be a big problem, warned Merle Hostetler, vice president, Federal Reserve Bank of

Technical Outlook—Page 141 Market Outlook—Page 179

Cleveland. It is dangerous to pass on all the benefits of productivity to the worker, he claimed. "It may be all right for a single company to pass them on, but soon workers in other industries want the same, then everybody has to have them—the cab driver, the store clerk, nonproduction workers." The result: Runaway inflation. For other views on the economy in 1962, see Page 97.

Thinner Tin Meets Wide Acceptance



Narrow strips of tin plate are threaded five at a time through the eye of a needle to dramatize the space savings possible with Jones & Laughlin Steel Corp.'s new form of tin coated steel sheet. The thinner plate also saves weight. J&L says the new product is winning wide acceptance among can manufacturers who make tin coated steel containers for foods, beverages, and other products.

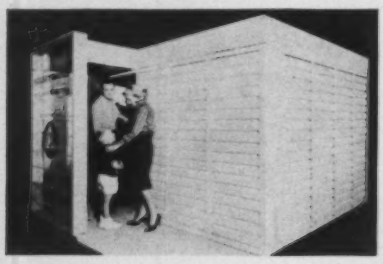
Volkswagen Makes Bigger Dent in U. S. Market

Volkswagen of America reports its passenger car sales in the first seven months (103,159 units) were 16.8 per cent above those of the year ago period. July sales represented 3.1 per cent of all car sales in the U. S. and 46.3 per cent of all imported cars sold here.

Canadian Plants Prepare for Increased Activity

Canadian manufacturing plants are building inventories of raw and finished materials for the first time in 19 months, reports the Canadian Association of Purchasing Agents (CAPA). Reflecting the anticipation of increased business activity, a recent CAPA survey shows gains in new orders, production, and employment. A busy fourth quarter is predicted for the steel industry, and leadtimes are already being extended on some items.

Fallout Shelter Designed for Mass Production



World tension has spurred interest in bomb shelters throughout the U. S. The shelter shown above is designed for mass production, which would make it economical enough to insure widespread use, says developer, Kelsey-Hayes Co., Romulus, Mich. The homeowner may erect the shelter by bolting sheet metal panels together and filling them with earth or sand. Armco Steel Corp. is also set to market metal shelters ranging from $700 to $1800 in price.

Ford Swings into Defense Effort

"We're moving into the defense and space business with both feet," says John Dykstra, president, Ford Motor Co. Two signs: Ford is preparing its bid to manufacture the first stage booster of the Saturn space vehicle and recently proposed the acquisition of Philco Corp. Philco is in the TV, appliance, electronics, and defense businesses. In addition to producing military equipment, autos, trucks, and tractors, Ford is already a primary producer of steel, glass, plastics, and paints.

Water Conversion Unit Offered for Hurricane Disaster Area

Interior Secretary Stewart L. Udall has offered to send a saline water conversion pilot plant to the Hurricane Carla disaster area. Mounted in a trailer, the unit could produce critically needed fresh water at a rate of 15,000 gallons a day where the normal supply has been polluted by sea water.

Is Your Heat Processing Out of Date?

Many changes have come about during the last several years which could affect the heat processing of this strip or any product. New ideas and modern equipment aim at greater automation, more precision, and added safety. But a STEEL survey shows half the equipment in use is more than ten years old and many firms are not even making the best use of present facilities. What can these changes mean to you? See Page 142.

Depreciation Allowances Lag by $6 Billion a Year

Replacement costs in U. S. industry are exceeding depreciation allowances by $6 billion a year, "and the situation is getting worse," states C. B. Pharo Jr., assistant general manager of sales, Republic Steel Corp. If the administration wants to stimulate over-all economic growth, "one of the surest methods it can employ is the across-the-board liberalization of depreciation allowances," he says.

Power Companies Aim at $8 Billion Expansion by 1970

Investor owned electric companies plan to spend nearly $8 billion for new power transmission facilities by 1970, says Elmer L. Lindseth, chairman, Cleveland Electric Illuminating Co. It will more than double the present investment of $6.7 billion.

Boom for Aluminum May Not Be Far Off

The aluminum industry could enter a boom period "sooner than anyone has the boldness to predict," claims Walter L. Rice, president, Reynolds

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September 25, 1961 Vol. 149 No. 13

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Editorial index available semiannually.

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Mining Corp. He says aluminum shipments have rebounded sharply to an annual rate of about 2.5 million tons, which should bring 1961 shipments to 2,450,000 tons, up 4 per cent from last year. Mr. Rice believes continuation of the business uptrend and inventory rebuilding could push 1962 shipments to a record 2.9 million tons.

Lone Star Sues for '57 Strike Losses

Lone Star Steel Co. has filed a $5.5 million suit against the United Steelworkers of America in the U. S. District Court, Dallas Division, to recover losses alleged to have resulted from a strike at its main plant in 1957. Noting similar suits have been filed during strikes, President E. B. Germany says: "Tactics or strategy are not involved at this point. The strike is over; we have a four year contract; and we intend to put forth every effort to collect damages from this union led, illegal strike."

8 Per Cent Gain in Plant, Equipment Spending Predicted

Manufacturers will boost plant and equipment outlays 8 per cent in 1962 over this year's total, predicts Robert M. Hatfield, vice president, Combustion Engineering Inc. "Despite the present decline in commitments and appropriations for durable goods, we anticipate this trend will reverse itself before this year's end and there will be a measurable change for the better in 1962," he said at the National Industrial Conference Board's marketing meeting last week.

Straws in the Wind

GI home loan activity in August was the highest since the fall of 1959, says the Veterans' Administration . . . Mark V. Keeler, vice president, International Harvester Co., predicts farm equipment sales will increase 5 to 8 per cent next year . . . Beryllium Corp. last week raised its prices on beryllium alloy wrought and cast products about 2 per cent . . . Myron H. Watkins, vice president-sales, Youngstown Sheet & Tube Co., has resigned. Robert Williams, sales vice president, National Tube Div., U. S. Steel Corp., succeeds him.

Metalworking Pulse

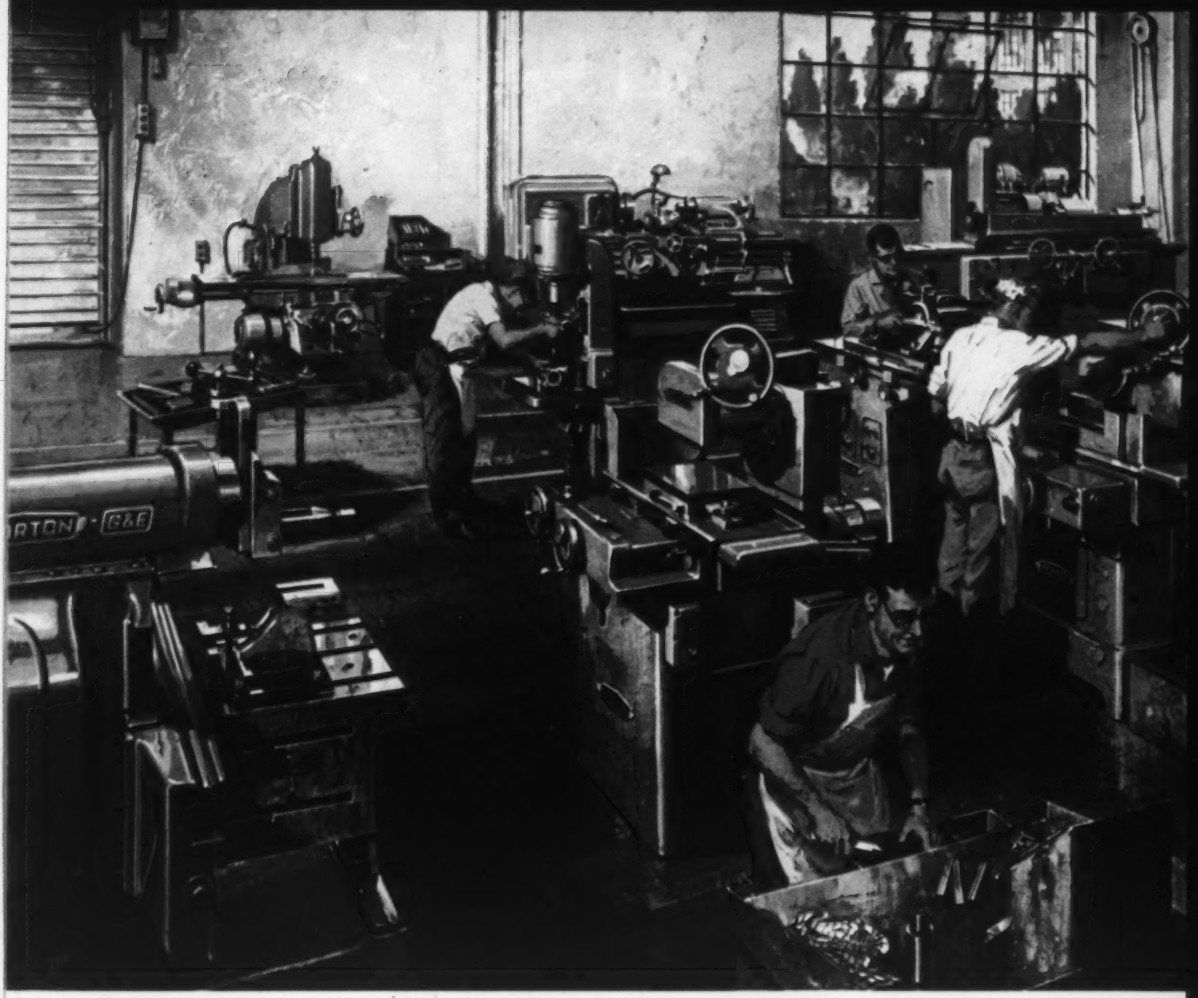
The Business Trend: A seasonal decline in output of electricity combined with the auto strike to hold down STEEL's industrial production index to a preliminary 162 in the week ended Sept. 16. **Autos:** The decline in auto output because of labor problems is expected to add to production in the fourth quarter, originally scheduled for about 1.7 million completions. **Steel:** Ingot output continues to advance slowly. The auto strike put brakes on the expected September surge.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Sept. 16 . . **162†**
  Year ago **145**
  Details on Page 117
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Sept. 23 . **65,000***
  Year ago **120,722**
  Details on Page 114
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Sept. 23 **2,040,000***
  Week ago **2,032,000**
  Details on Page 188

†Preliminary. *Estimated.

Meet the

"FIRST FAMILY" OF TOOL ROOM MACHINES



It's easy to know the Norton Family of Tool Room Machines. Their home is the modern tool room — and their scope is as broad as industry.

Above, you see them on the job — with each Norton machine adding its own special advantages to an efficient tool room operation. On the reverse side you'll find each member of the Norton family described in detail.

Specifically, the family includes a No. 200 Cutter and Tool Grinder; a Type S-3 Hydraulic Surface Grinder; a Type TS Hand Surface Grinder; a Type U-4 Universal Grinder; a Norton-G&E Shaper.

Separately or as a group, this "First Family" will bring top-ranking efficiency and economy to your own tool room — will help you maintain tools or produce jigs and fixtures that perform better . . . last longer.

For details on how Norton tool room machines can benefit your own operation see your Norton Man, a trained Machine Specialist. Or write to NORTON COMPANY, Machine Tool Division, Worcester 6, Mass.

District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit; In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

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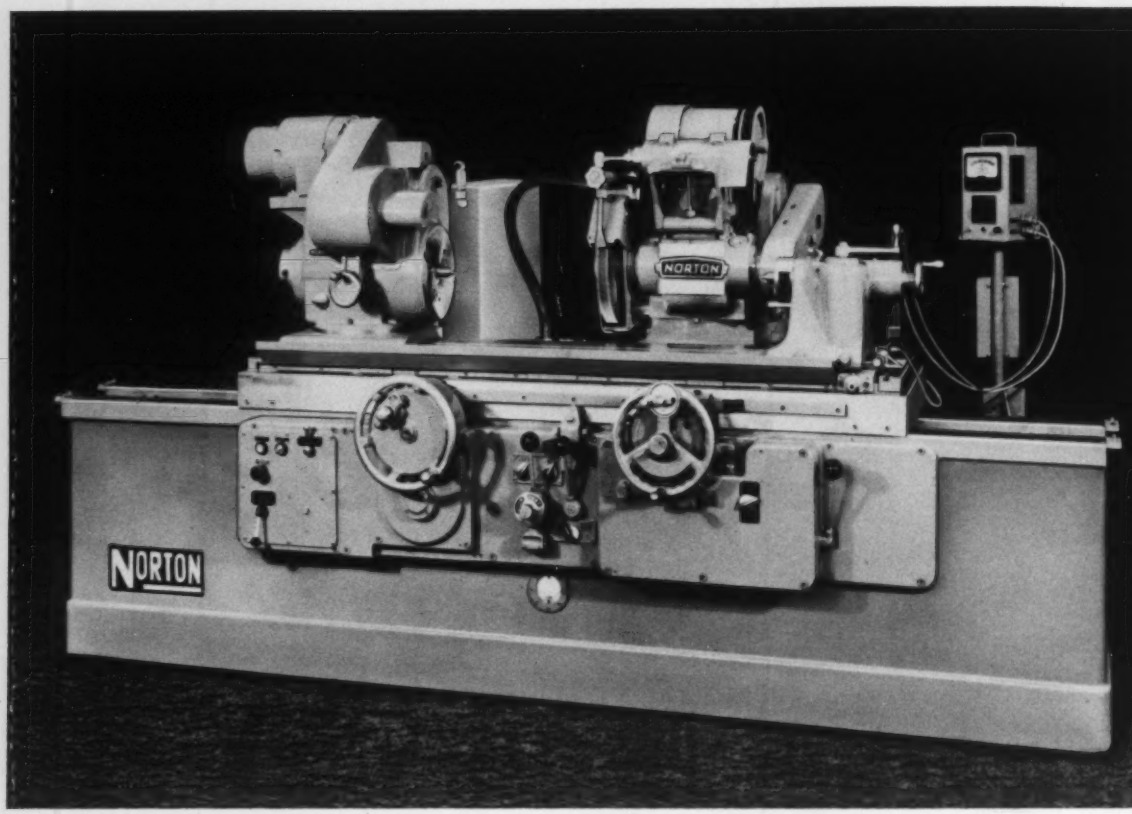
MACHINE TOOLS

Making better products . . . to make your products better

From the Norton

"FIRST FAMILY" OF TOOL ROOM MACHINES

Universal Grinders



Featuring extra versatility . . . extra fast setups

In a Norton Universal Grinder of any size — 10″, 12″, 14″, and 18″ — you get a practically complete grinding department. Versatility keynotes the design, with quick, easy setups for external, internal, face and angular wheelslide grinding — and with feature after feature increasing the job range and cutting tool conservation costs. For example:

Extremely rapid chucking . . . quick changeover to live or dead spindle operation . . . wide range of easily changed work speeds . . . independent wheel and feed settings for doing difficult jobs fast.

Available for use on all Norton Universal Grinders, the SWIVALIGN* Dual Electric Indicator, shown here on a 14″ Type U-4, eliminates cut-and-try in establishing swivel table alignment. Ask your Norton Distributor or write for Catalogs Nos. 170, 231 and 819.

*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries

ECONOMIZE with Norton Tool Room Machines

From the Norton

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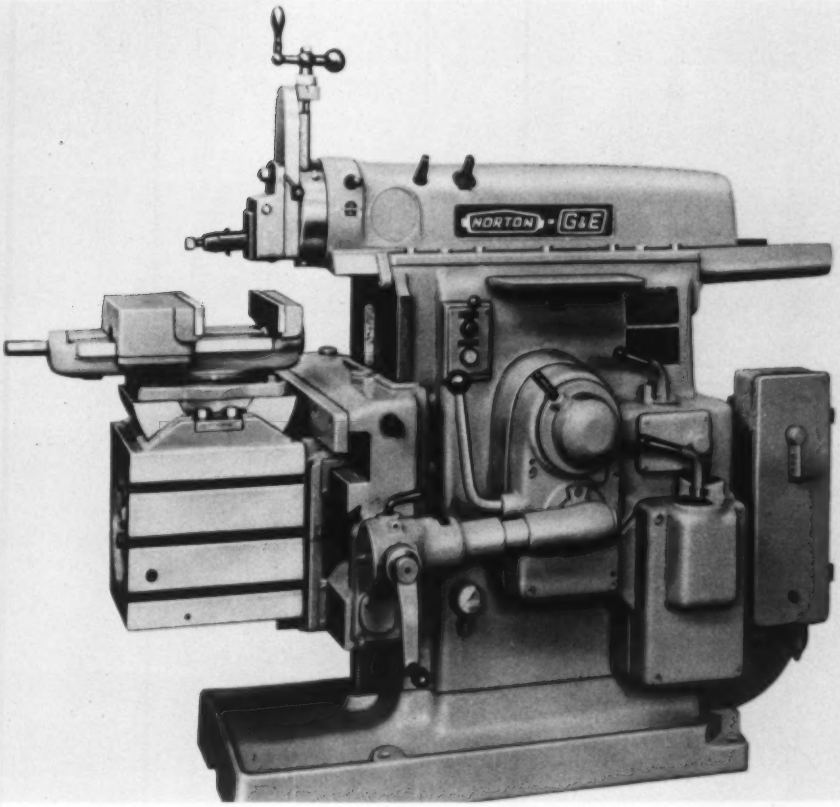
G&E Tool Room Shapers



The finest for generations

Backed by over a century of precision machine tool building, G&E Shapers feature 16 easily selected ram speeds, all-helical gear drive and many other developments with proved ability to cut time and costs.

G&E Tool Room Shapers, in 14″ and 16″ sizes, meet the constantly expanding field of shaper work and are outstanding for miscellaneous tool room and heavy die work. Convenience of controls and ruggedness of construction enable these machines to produce a wide range of variable flat and compound angular surfaces.

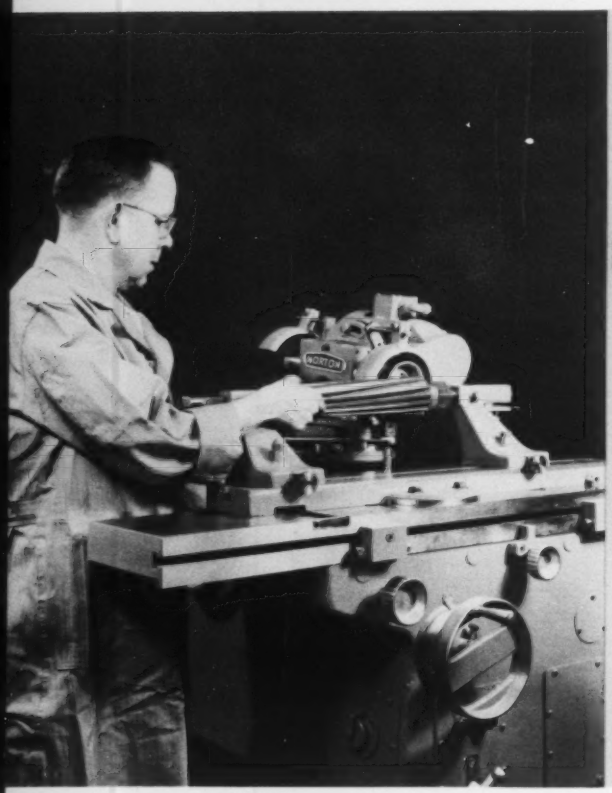
Featured on Norton-G&E Shapers are: Hard chrome ram V-ways for constant accuracy and long life; crossrail and table slide design that provides 60% more bearing area and 50% greater rigidity; central controls are conveniently located for easy selection of the 16 ram speeds and 18 feeds; operator can adjust table and lock crossrail from control side; built-in horizontal and vertical rapid traverse to work table, with safety clutch, always operates in *opposite* direction to feed set. Ask your Norton-G&E Distributor or write for Catalog No. 2342.

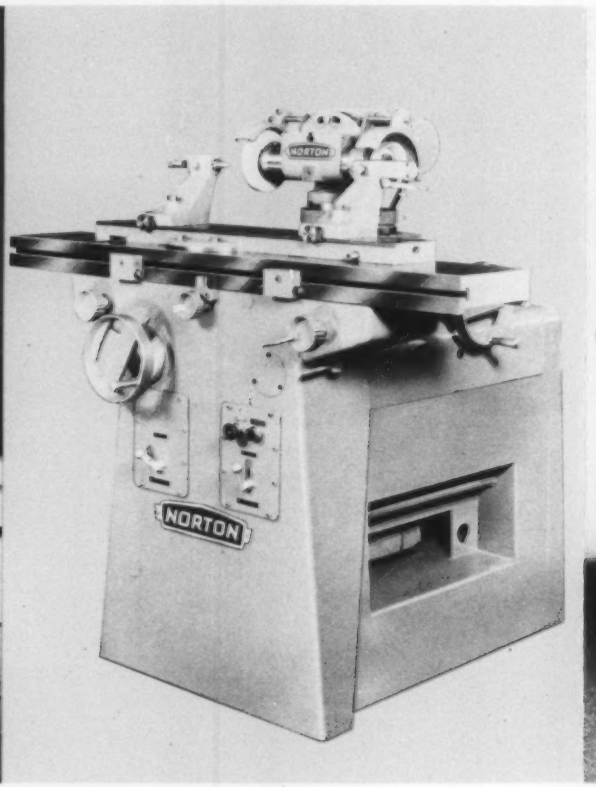
MODERNIZE with Norton Tool Room Machines

From the Norton

"FIRST FAMILY" OF TOOL ROOM MACHINES

No. 200 Cutter and Tool Grinders





The wheel head TILTS 30° ... ORBITS 360°!

No time-wasting "cut and try" routine with the Norton No. 200 Cutter and Tool Grinder . . . no more wrestling with tricky setups.

You can tilt the wheel head up to 15° above or below horizontal — and swivel it through a full orbit of 360°. For the first time with a tilting wheel head, the Norton two-speed grinding wheel spindle provides the right speed for large or small wheels.

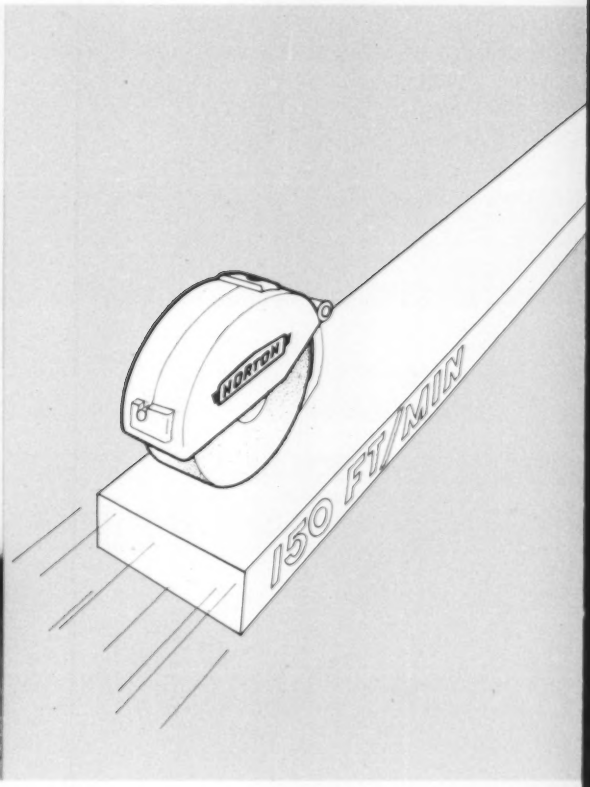
A wheel head scale provides quick direct reading of clearance angles. The wheel head can be adjusted to eliminate many of the usual settings and time losses. And the table has a rugged guide bar for precision in tracking during the toughest grinding jobs.

Also, the No. 200's extremely solid grinding action brings you excellent finish on tool cutting edges, for longer lasting, better performing tools. Other features include: wheel-slide construction to eliminate possibility of work overhang; anti-friction elements under table to provide fluid table motion; dual, centrally-located controls to simplify operation from any position. Ask your Norton Distributor or write for Catalog No. 1371.

From the Norton

"FIRST FAMILY" OF TOOL ROOM MACHINES

Type S-3 Hydraulic Surface Grinders



FINISH FLAT FASTER!

Popular for a wide variety of tool room grinding, as well as long production runs, Norton Type S-3 Surface Grinders have given complete proof of their ability to finish smoother, faster, at lower cost.

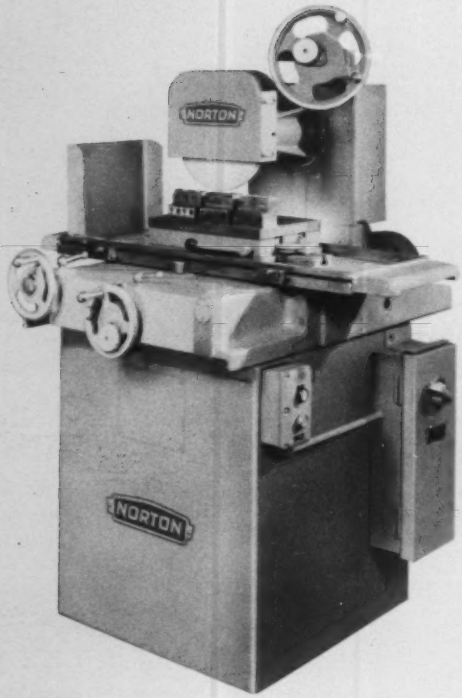
Now, S-3 Grinders are available with a new maximum table speed of 150 fpm as standard. With higher table speeds, the stock removal rate is increased and the grinding time is reduced in proportion to the increase in stroking rate. The faster table speeds also provide extra cool grinding action that reduces heat damage to the work. Time and money are saved on every job.

Sizes of the S-3 Grinders are 6″ x 18″ and 8″ x 24″, both being equally fast, cool and accurate grinding. Taller workpieces . . . up to 15″ on the 6″ size and $13\frac{3}{4}$″ on the 8″ size . . . are easily handled. Other job-proved features include a two-speed .0001″ increment hand wheel, for accurate vertical speed and fast positioning, and contoured splash guards for better visibility. Ask your Norton Distributor or write for Catalog No. 1772.

From the Norton

"FIRST FAMILY" OF TOOL ROOM MACHINES

Type TS Hand Surface Grinders



New... for your daily tool room jobs!

Available in sizes 6″ x 12″ and 10″ x 16″ the new Type TS Hand Surface Grinders bring you these typical Norton advantages for tool room machines:

Precision Performance. Wheel feed hand wheel has graduations of .0005″ for fast, accurate positioning, plus a vernier scale graduated .0001″ for precise grinding feeds. The long, rigid vertical slide and saddle provide greater support for moving parts, reduce vibration and improve finish. Accurate cross-feed is excellent for groove and shoulder grinding.

Easy Operation. Controls at working height are quickly accessible; design enables easy seated or standing operation. Handwheels eliminate cross-arm operation of table and cross slide. TS Grinders are the only machines of their type with hinged wheel guard for quick wheel change.

Overall Economy. Strengthened by many other simplified, long-lasting features for clean, uncluttered design which reduces maintenance costs. Ask your Norton Distributor or write for Catalog No. 388.

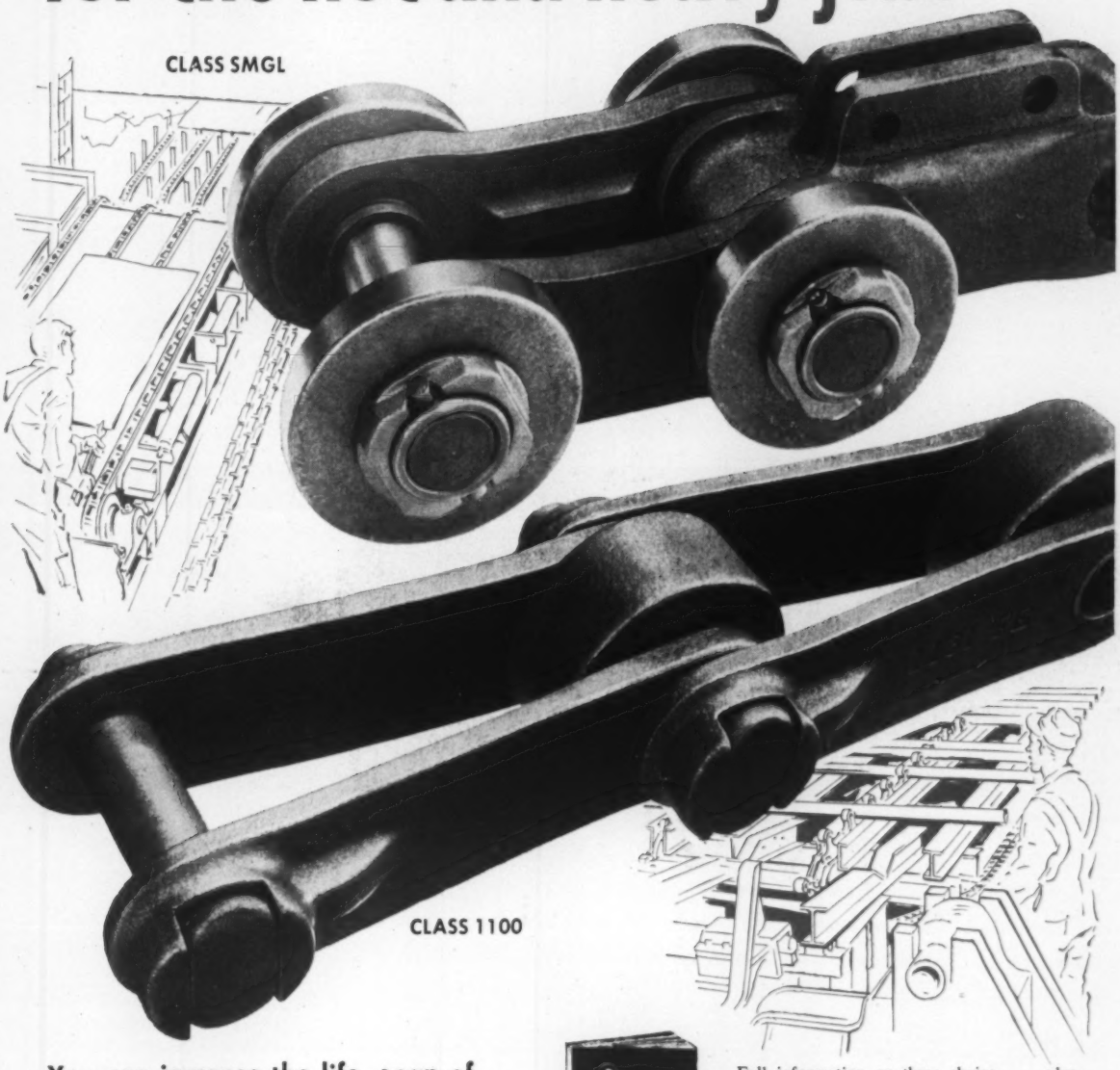
...r Cutting Machines

NORTON
MACHINE TOOLS

Printed in U. S. A.

Best chain choice

for the hot and heavy jobs



You can increase the life-span of your conveyors with LINK-BELT Class SMGL and 1100 chains

Where operating conditions involve heat and hard service beyond the ordinary, you need the *extra*-ordinary stamina of these Link-Belt chains.

CLASS SMGL combination chains are designed specifically for furnace conveyor service. Sidebars and center links are made of "file-hard" Promal, with bosses on sidebars to reduce stress on free-floating pins. CLASS 1100 roller chain is ideal for horizontal or inclined rolling elevators and conveyors.

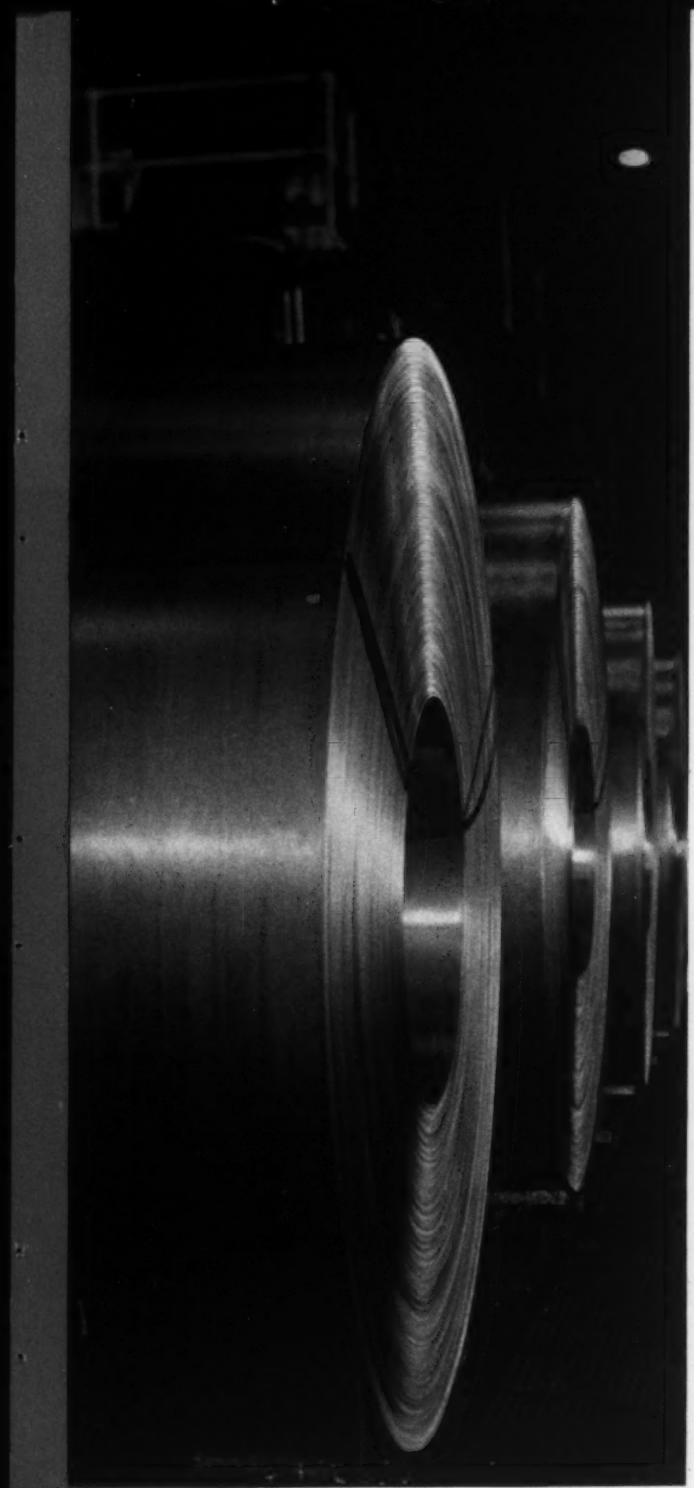
Full design information on both is contained in Catalog 1050. Your Link-Belt representative will counsel on chain selection for high temperature conditions.

Full information on these chains . . . plus a broad line of attachments and sprockets—is contained in Catalog 1050. Get your copy by writing direct . . . or call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your Phone Directory.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,075



NEW 79"

You get larger coils, higher quality from Youngstown's big, new 79" hot strip mill

Higher quality hot rolled steel sheet in larger coils. That's what you get from our expanded and modernized 79" hot strip mill in Campbell, Ohio. To bring you improved hot rolled sheet and strip, more than $60,000,000 was invested. Probing television monitors and delicate, sensitive electronic devices plus massive roll stands, and bigger coilers combine to bring you even better quality control.

These improvements in our hot strip mill are only part of Youngstown's sheet and strip story. New coil annealing facilities, a new shear line and a new Youngstown open coil annealing process for one coat enameling sheets give you a growing source of hot and cold rolled steel products.

Get steel stamped with the mark of Youngstown. Get longer, stronger, flatter steel. Steel sheet and strip of more uniform quality. With better physical properties. Hot and cold rolled steel that is easier to work with and more economical to use because you can get larger coil sizes to 38,000 pounds. In 24" to 72" widths. Order to your specifications. Get fast, reliable delivery from your Steel Service Center or through the 28 Youngstown Offices.

Youngstown – growing force in steel

For full details on Youngstown steel sheet and strip, write: Dept. 11-A,
The Youngstown Sheet and Tube Company, Youngstown, Ohio

proper values the Rooster and the Diamond

A rooster was scratching around in his barnyard, looking for corn and worms. He came upon a brilliant diamond which someone had lost. // All the hens fluttered around to see and admire its sparkling beauty. But the rooster went on with his scratching elsewhere. // "No doubt, it's a fine item for those who can use it," he mused, "but I want nothing more than to keep on finding food."

moral: Don't let fancy outshine value.

We don't crow too much about fancy cylinder features. Keeping your machines in motion is our satisfaction. But when two important new advantages we know you can *use* are designed into Hydro-Line cylinders, we like to explain how they can help you increase productivity and meet shipping deadlines.

"Duraton" rod seals and wipers in our Series N2 hydraulic cylinders are formed from a fluoro-elastomer which resists 400° F heat— is compatible with virtually all hydraulic fluids. (Optional, at slight additional cost, on Series R2 cylinders.)

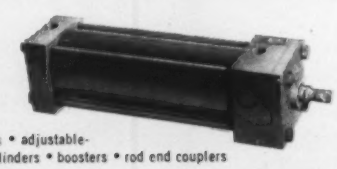
Chrome-plated barrels for Hydro-Line air cylinders virtually eliminate scoring in rugged applications. Corrosion is eliminated, even where condensation is unusually severe.

Look in *Sweet's Product Design File* for dimensions of our standard stock cylinders, ready for "off-the-shelf" delivery. Check the address of your nearest Hydro-Line representative. Then ask him to help you select the correct cylinder for hydraulic applications to 5000 psi and air operations to 200 psi. Or, phone the factory direct: 815 TRemont 7-5711.

HYDRO-LINE

HYDRO-LINE CYLINDERS

5604 PIKE ROAD, ROCKFORD, ILLINOIS, manufacturers of: high- and low-pressure hydraulic cylinders • heavy-duty air cylinders • adjustable-stroke cylinders • dispensing cylinders • intensifiers • single-acting cylinders • boosters • rod end couplers



UNITED®

4-HIGH 2-STAND TANDEM TEMPER PASS MILL

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ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio
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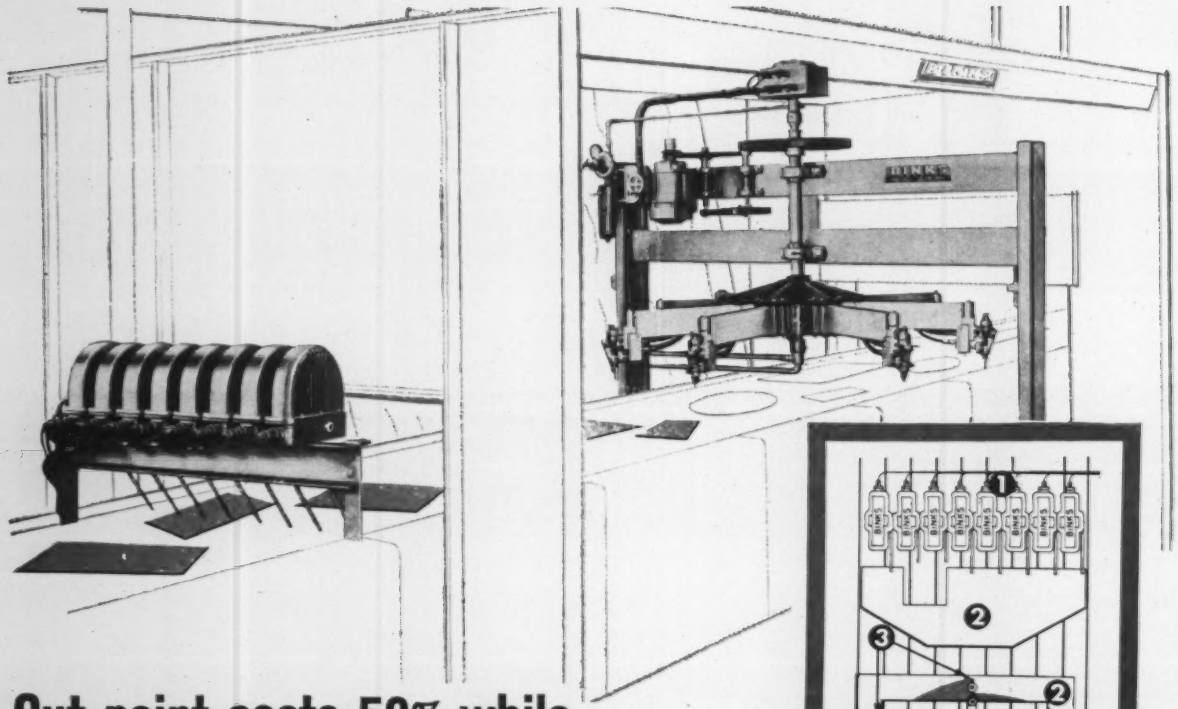


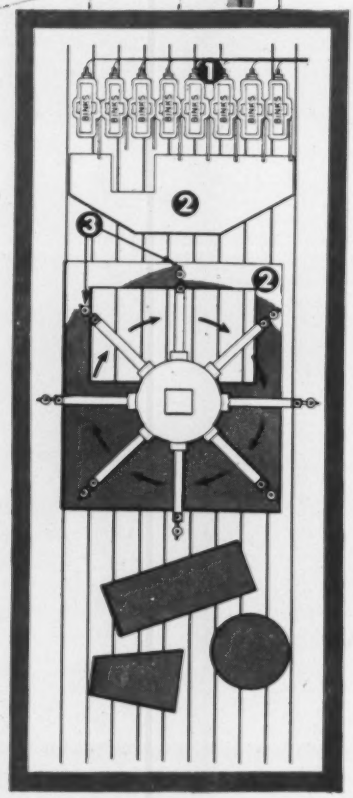
Cut paint costs 50% while spraying odd shapes up to 90 fpm

Tailor made automation at standard parts cost with Binks exclusive all new MEMORY TIMERS

Binks Memory Timer, a unique new electro-mechanical control mechanism, coupled with standard Binks spray equipment, gives you paint economies never before possible with automatic spraying . . . all without the expense of custom-made engineering.

The Memory Timer senses the size and shapes of objects passing beneath it on a conveyor and transmits the information to automatic spray guns. The rotating spray guns (available with 4 or 8 arms) operate only when the objects are in direct line of fire. Result: materials needed to finish a given run are drastically reduced (savings of 50% are not uncommon). Plus, you can spray up to 90 feet per minute with an 8-arm unit.

A precision instrument, the Memory Timer is unaffected by spacing timing and speed variations. Synchronized with conveyor movement, the timer stops, starts, increases or decreases speed without adjustments or resetting. Memory Timer units can be used singly, or in multiple units driven by a common drive to accommodate almost any conveyor width. Binks Memory Timer units are adaptable to most spraying machines already in service.



Here is how the system looks from above

(1) Binks MEMORY TIMERS astride your conveyor sense size, outline and location of (2) irregularly-shaped products to be sprayed and relay this information to (3) your automatically operated spray guns.

Ask about our spray painting school. Open to all . . . NO TUITION . . . covers all phases.

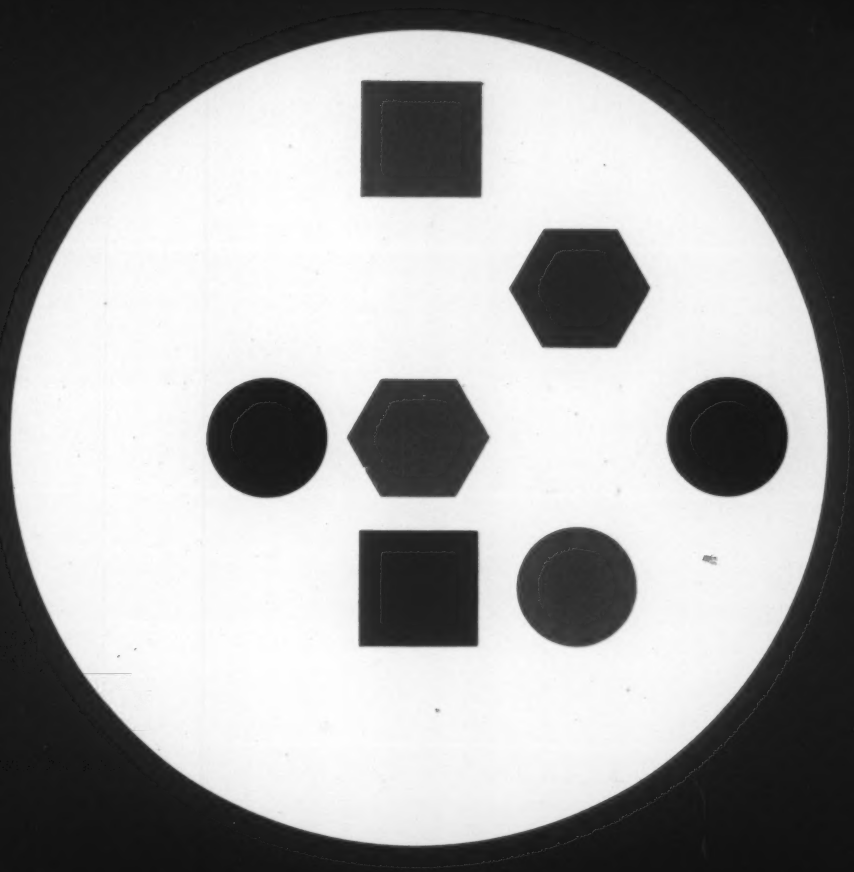
Binks Manufacturing Company 3148A Carroll Avenue, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

Send for Bulletins A96-1R and A96-4 for complete information or, call your Binks representative; he's as close as your telephone.

1338

Binks Everything for spray painting



Widest Range from Any Distributor Source. Calling on your local Alcoa distributor for aluminum in all its forms is like having an Alcoa plant next door. Nobody else stocks as much sheet and plate; wire, rod and bar; tube and pipe; and extruded shapes in as many sizes, alloys and finishes. Nobody else can respond as quickly to your call for metal or technical advice.

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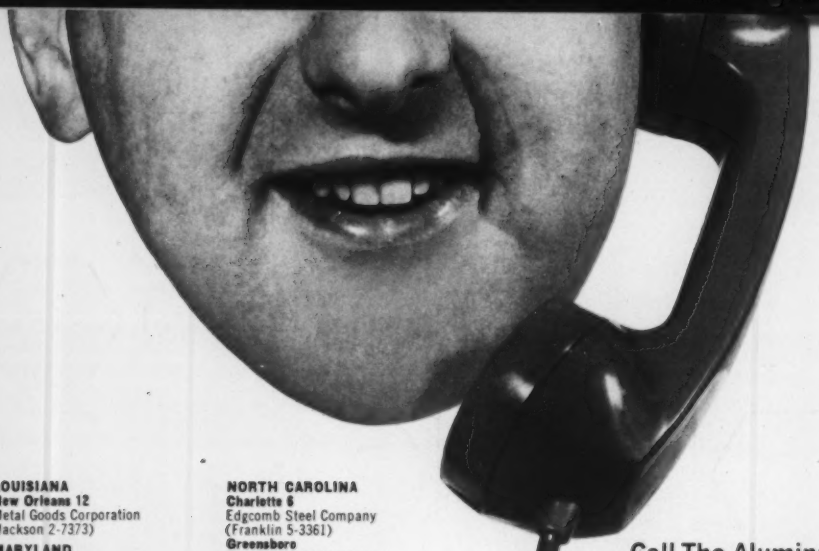

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Pacific Metal Company
(Capitol 7-0693)
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ALCOA ALUMINUM

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Call *The Aluminum Man* . . . he's your Alcoa distributor sales representative

Avco puts the PlasmaGun to work—in your plant

This Avco PlasmaGun spray-coats metals, ceramics and refractories with a thickness, density and bond strength never before possible—right on your production line.

It sprays uniformly without clots or streamers at roughly half the cost of other plasma equipment. And you can save up to 30% over conventional spray-coating—even more when fabricating free-standing parts from materials such as tungsten.

The Avco PlasmaGun takes powders previously too fine for other plasma equipment. The cathode is adjustable, too, for convenience and economy. (No need to switch cathodes each time you change powders.)

The cost? Lower than you think. It can pay for itself on the first job. Maintenance? Easiest of any gun in the field. (The PlasmaGun assembles with only 4 bolts!) Warranties? On all parts, for six months. (Another exclusive Avco feature.)

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Avco's special PlasmaGun booklet describes the complete system. Send for your free copy right now!

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Please send free information about new PlasmaGun system.

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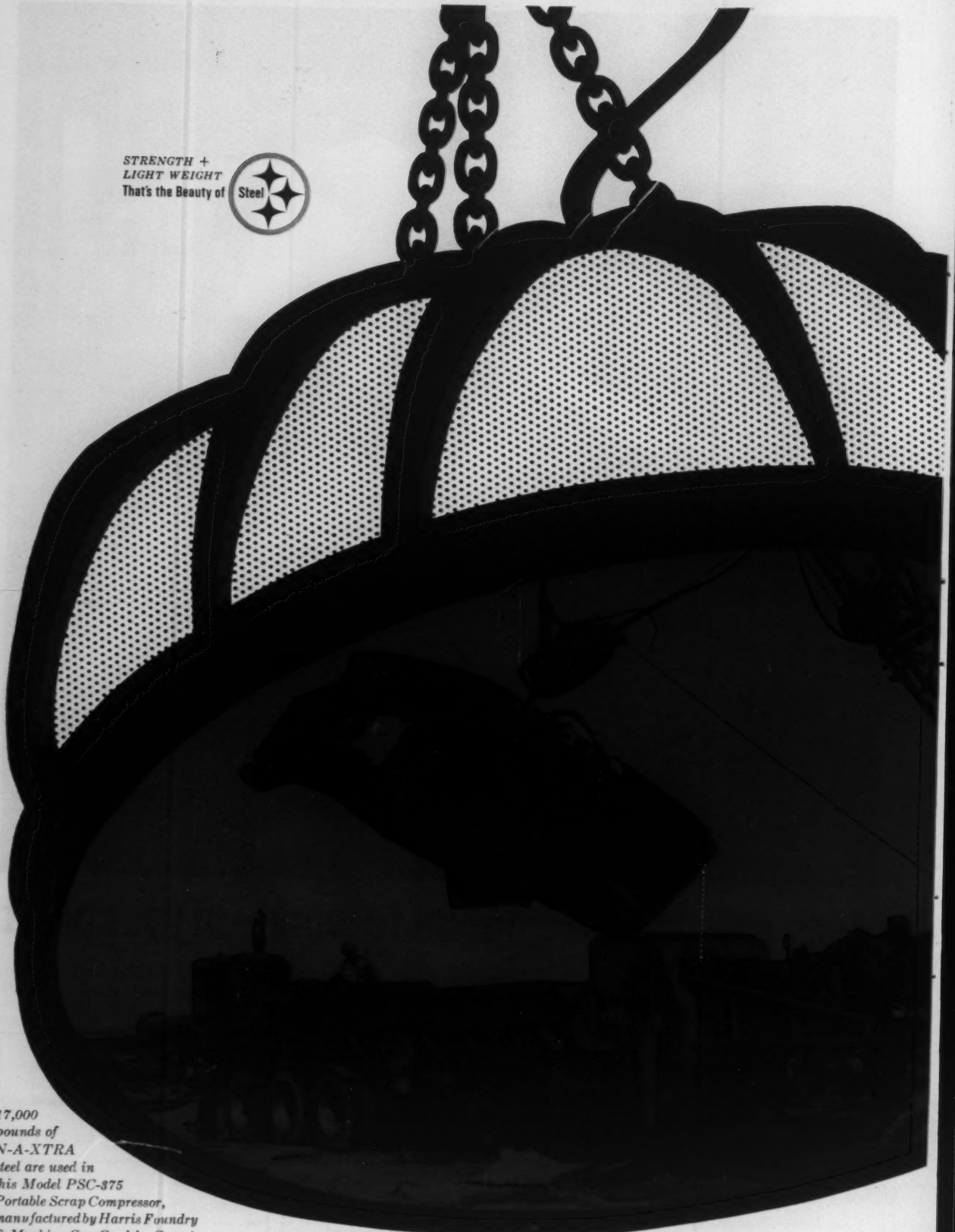
STRENGTH +
LIGHT WEIGHT
That's the Beauty of Steel

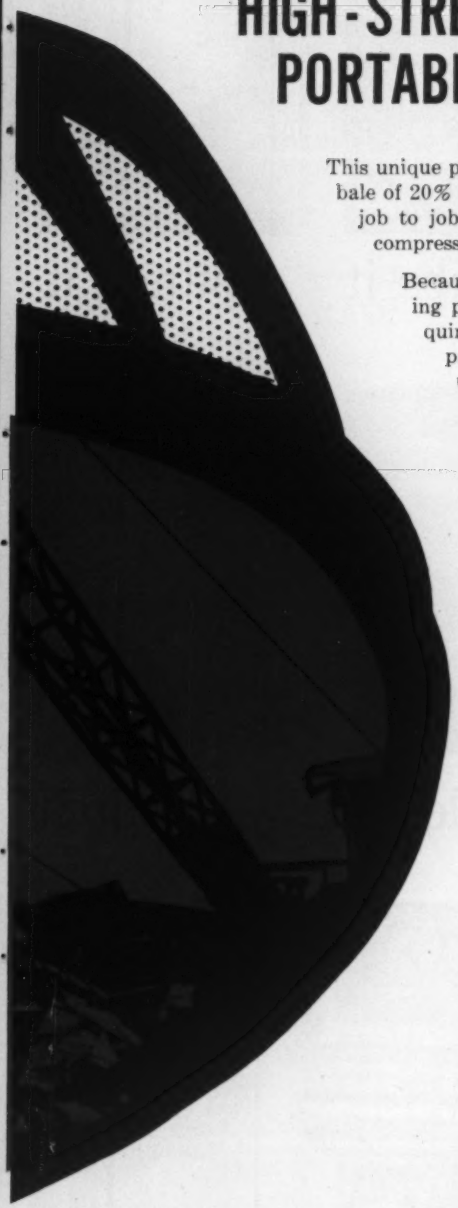


17,000 pounds of N-A-XTRA steel are used in this Model PSC-375 Portable Scrap Compressor, manufactured by Harris Foundry & Machine Co., Cordele, Georgia

STRENGTH + LIGHT WEIGHT OF

N-A-XTRA

HIGH-STRENGTH STEEL SOLVES PORTABLE SCRAP COMPRESSOR PROBLEM



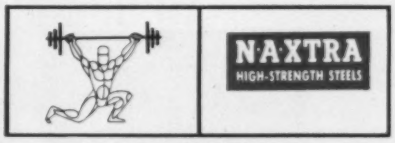
This unique portable scrap compressor can squeeze an entire auto body into a 21″ x 36″ x 24″ bale of 20% dense steel scrap, using a ram pressure of 375 tons. Designed to be hauled from job to job by a conventional truck-tractor, it goes to work in outlying wrecking yards, compressing bulky scrap into marketable bales that can be shipped economically.

Because it must be moved over the highway and meet established load limits, a pressing problem in designing the PSC-375 was weight. Mild carbon steel with the required strength would weigh too much. N-A-XTRA high-strength steel solved the problem. It fully met all strength and fabrication requirements, yet kept total unit weight within acceptable limits for portability.

Portability may not be the controlling factor in your product—but the same steel that solved this problem is the one to remember when only the strongest steel will do. Pound for pound, N-A-XTRA steels are nearly three times stronger than mild carbon steel. Rugged conditions, heavy loads and weight-saving construction—in such applications, for example, as heavy machinery and pressure vessels—are challenges that N-A-XTRA is designed to meet.

With excellent weldability, formability, and toughness even at subnormal temperatures, N-A-XTRA low carbon, extra strength alloy steels give superior results with conventional fabricating methods, including cold forming, gas cutting, shearing and machining. N-A-XTRA high-strength steels are available in four levels of minimum yield strength, from 80,000 to 110,000 psi, and in sizes ranging from ⅛″ to 1″ thick, up to 72″ wide and up to 35′ long. For further information, write Product Development, Dept. SM-12, Great Lakes Steel Corp., Detroit 29, Michigan.

DESIGN NOTE: Model PSC-375, Portable Scrap Compressor, uses N-A-XTRA 100 (minimum yield strength, 100,000 psi) in engine and tank mounts, bed and side ribbing, arm housings and end housing. Sizes—¼″, ⅜″, ½″, ¾″ and 1″ thick. Fabrication followed standard gas cutting and welding procedures.



a product of

GREAT LAKES STEEL

Detroit 29, Michigan

N-A-XTRA STEELS ARE AVAILABLE AT THESE STEEL SERVICE CENTERS

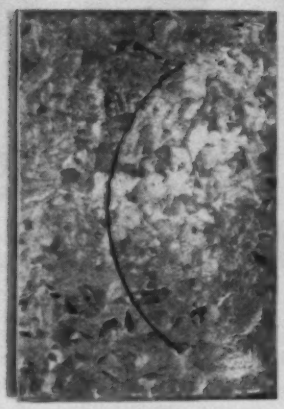
Benedict-Miller, Inc. Lyndhurst, New Jersey	Joseph Demsey Co. Cleveland, Ohio	Ducommun Metals & Supply Co. Los Angeles, California
Interstate Steel Co. Des Plaines, Illinois	Lockhart Iron & Steel Co. Pittsburgh, Pennsylvania	Marsh Steel & Aluminum Co. Kansas City, Missouri
O'Neal Steel, Inc. Birmingham, Alabama	Salt Lake Hardware Co. Salt Lake City, Utah	A. C. Leslie & Company, Ltd. Montreal, Canada

Great Lakes Steel is a Division of **NATIONAL STEEL CORPORATION**

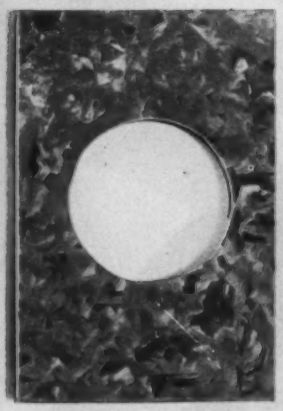
SOFTITE® BY WHEELING

...bend it

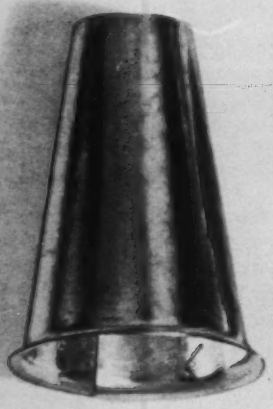
...hem it



...scribe it

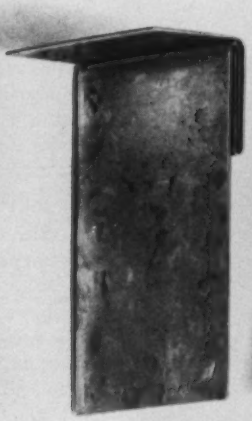


...punch it



...form it

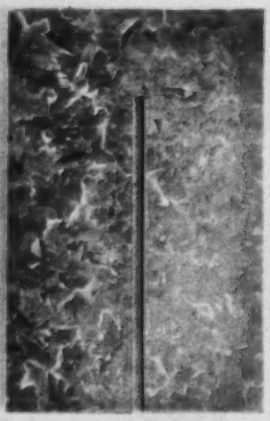
...notch it



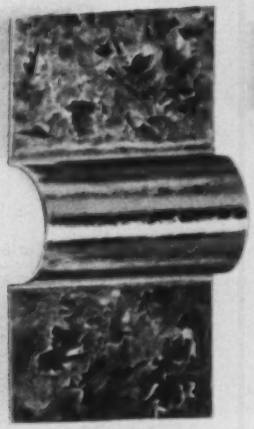
...lock it

...snip it

...paint it

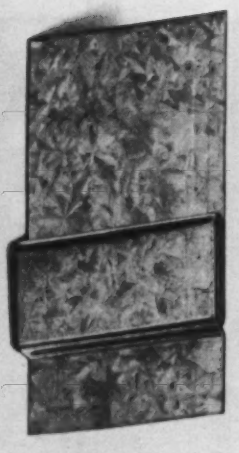


...saw it

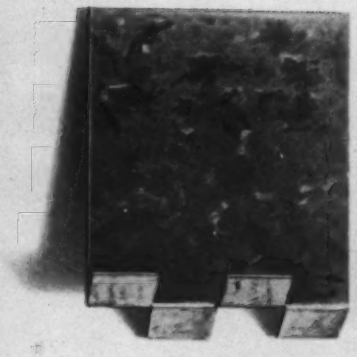


...stamp it

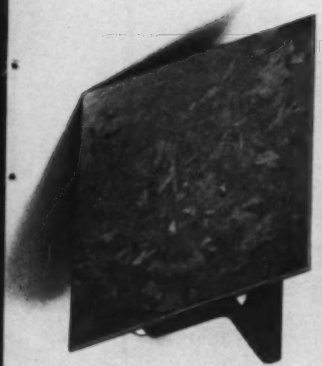
...shear it



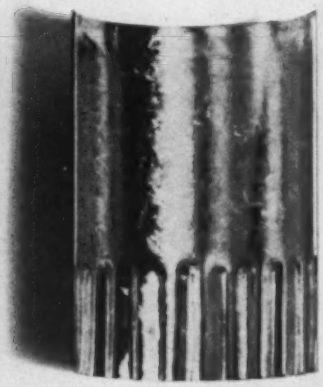
...seam it



...dovetail it



...weld it



...crimp it

...slit it

...draw it

OUR CHALLENGE STANDS!

"Anything that can be made of steel sheets can be made of Wheeling SOFTITE® galvanized steel sheets!"

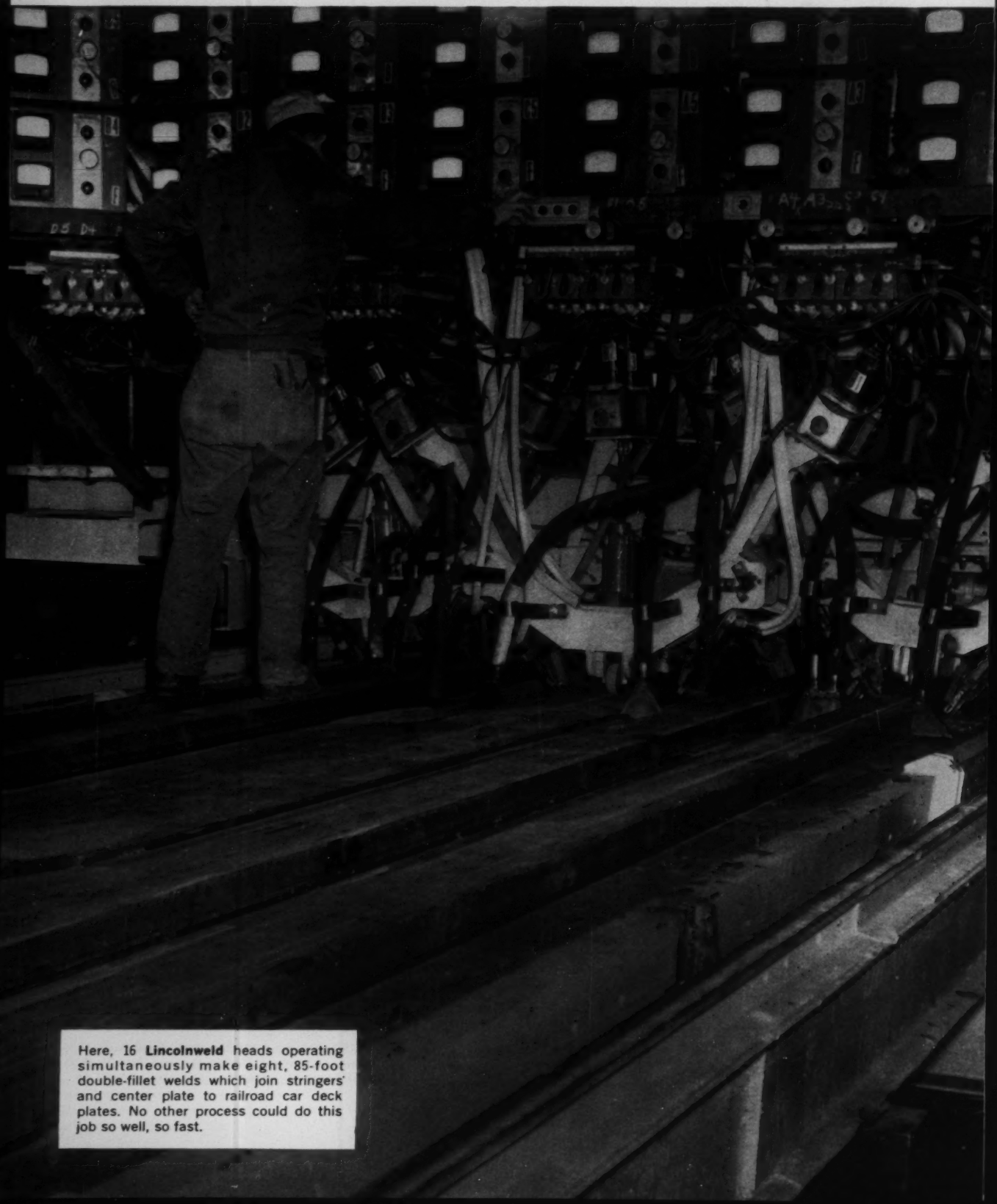
WHEELING STEEL CORPORATION • IT'S WHEELING STEEL!

District Sales Offices located at Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling

Steel

You can count on . . .

LINCOLNWELD SUBMERGED ARC WELDERS . .



Here, 16 **Lincolnweld** heads operating simultaneously make eight, 85-foot double-fillet welds which join stringers and center plate to railroad car deck plates. No other process could do this job so well, so fast.

...FOR PERFECT STARTS EVERY TIME

Photo on the left shows an expensive, fully-automated submerged arc setup with 16 welding heads. Press the button. Can you count on every arc to start perfectly? Every time? This manufacturer can. He chose **Lincolnweld** equipment. Because he knows its welding dependability, ruggedness and easy serviceability will protect his investment and guarantee production by consistently delivering good welds . . . fast . . . at low cost.

Here, single LAF **Lincolnweld** head is used to make large fillet welds on bridge sections at speeds not possible by any other process. Note conveniently-mounted controls which let operator govern process at all times. No involved electronic circuitry to get out of order. Components are easily serviced by shop electricians. Lincoln automatic submerged arc heads are made for AC or DC welding, in shop or in the field; can be used singly or in various combinations to get higher speeds, lower-cost welds.

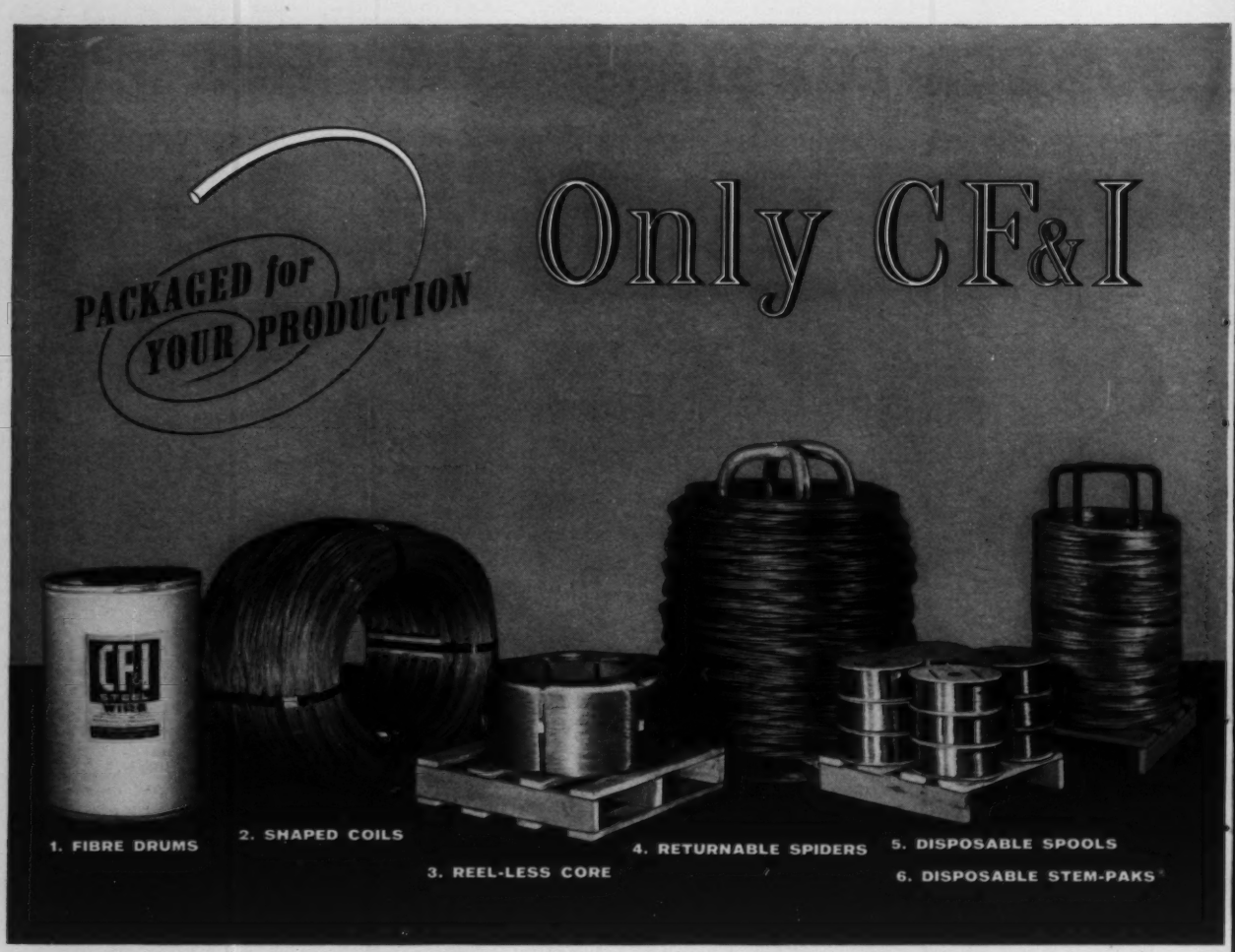
For short production runs, manual **Lincolnweld** gives you the benefits of submerged arc welding . . . continuous wire feed, high speeds and deep penetration . . . without the expense of fixturing. Here, ML-3 gun, propelled at pre-set speed by serrated wheel resting on work, provides a degree of mechanization and control not possible with manual welding.

Parts with unusual configurations were once welded exclusively by stick electrodes. Now, however, you can take advantage of submerged arc welding even on these kinds of joints with the ML-3 or the ML-2 shown here because of their inherent versatility. Result? Higher speeds, lower costs, better quality . . . at low initial capital outlays. See **Lincolnweld** submerged arc equipment in action. Contact your local Lincoln field engineer, a specialist in welding. Or, write for information on this equipment now.

THE LINCOLN ELECTRIC COMPANY • DEPT. 2961 • CLEVELAND 17, OHIO

LINCOLN WELDERS

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT AND ELECTRODES



Of all steel-wire manufacturers, *only* CF&I offers you high quality steel wire in all the packages shown above. These packages are designed to help you cut downtime . . . ease storage and handling problems . . . and increase daily production.

1. FIBRE DRUMS – 250-600 lbs. capacity. A sturdy container, with a center core, which holds wire of one continuous length. A metal cover and locking band seal the drum and protect the wire from atmosphere and dirt. Wire is withdrawn directly from the drum into your equipment. Two sizes: full and half drum.

2. SHAPED COILS – 1500-2500 lbs. capacity. This heavy coil contains wire of one continuous length, bundled with four steel straps. Will increase production up to 25%.

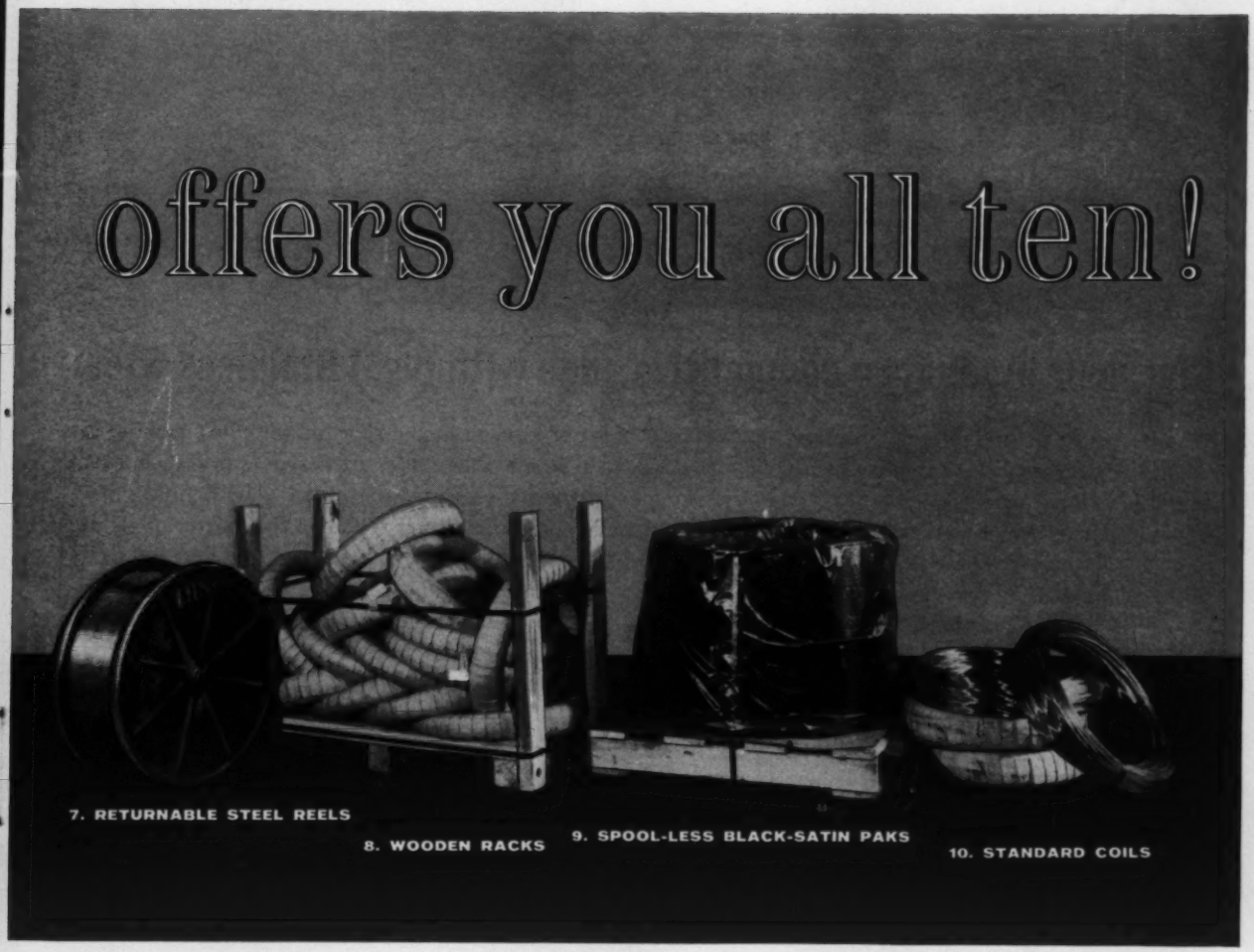
3. REEL-LESS CORE – 800-1000 lbs. capacity. Reduces shipping expense by eliminating deposit on reels and cost of returning empty metal reels. One continuous length is wound on a cardboard core. When received at your plant, the wire is placed on your aluminum, detachable-flange reel . . . ready for use.

4. RETURNABLE SPIDERS – 2000-3000 lbs. capacity. A sturdy wire carrier consisting of a center core of 2″ steel pipes welded to a heavy base plate. Holds one continuous length of wire, reduces downtime and increases production.

5. DISPOSABLE SPOOLS – 5-70 lbs. capacity. Can be used once and then discarded. Has the advantage of wire on spools with no deposit, no return of empty spools.

6. DISPOSABLE STEM-PAKS® – 500-1000 lbs. capacity. One continuous length of wire on a disposable pallet consisting of a center core attached to a wooden base mounted on 4″ runners. Speeds unloading, handling and increases production.

7. RETURNABLE STEEL REELS – 500-800 lbs. capacity. Holds one continuous length of wire, ready for smooth, even pay-off. Assures you wire free from damage in transit. Because reels require



less pay-off space, valuable production area can be saved.

8. WOODEN RACKS – 1500-3000 lbs. capacity. Protects coils during shipping and simplifies in-plant handling. Eliminates need for handling individual coils.

9. SPOOL-LESS BLACK-SATIN PAKS – 2000 lbs. capacity. Provides two 1000 lb. continuous lengths of oil tempered wire wound on cardboard cores, palletized and shrouded with polyethylene. Ideal for long production runs. Cuts downtime up to 90%.

10. STANDARD COILS—100-600 lbs. capacity. Packaged for a wide range of industrial uses. They are securely bundled and can be paper-wrapped for protection in transit and storage.

• • •

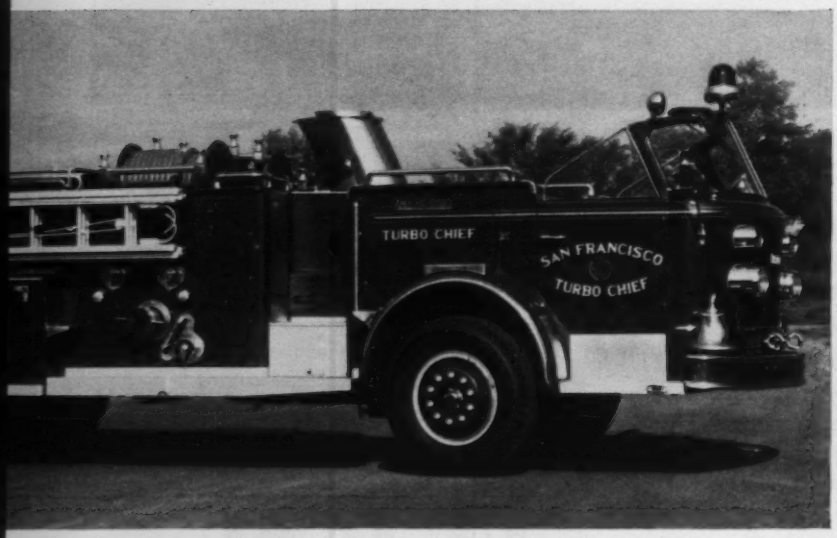
For more complete information on each of these ten wire packages, we invite you to consult your CF&I sales office.

8113

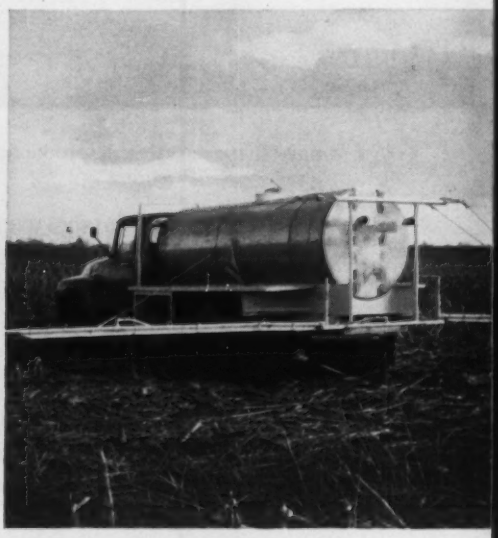
THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in All Key Cities

Give your products a competitive edge with USS Stainless Steel

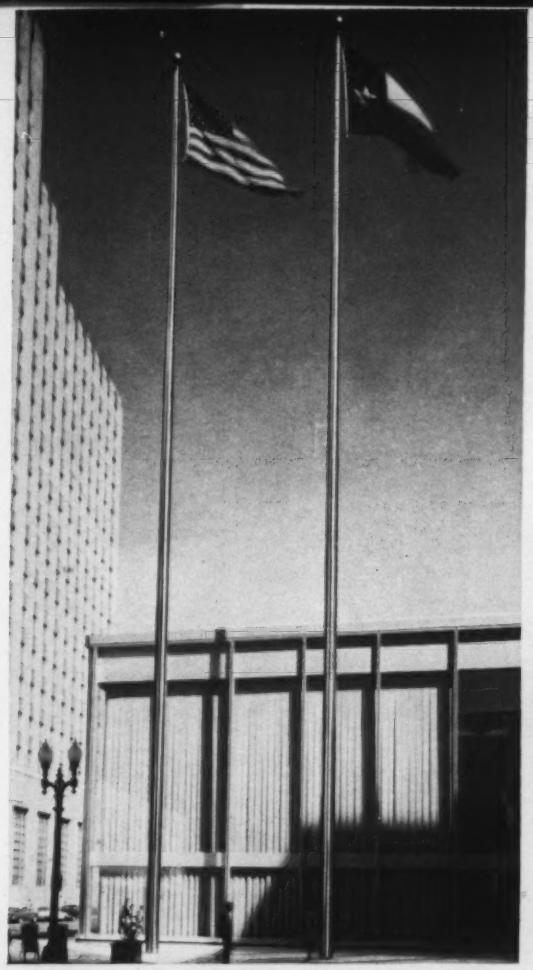
Whether your customer needs industrial equipment or a set of kitchen utensils for his wife, he's looking for quality. If you use Stainless Steel, you give him quality—in terms of long life, attractive appearance, extra strength and resistance to corrosion. Buyers have long known and appreciated the added value Stainless Steel puts into any product—generally anything made of Stainless is easier to sell. There is the matter of selling better performance. Knowledgeable buyers recognize the inherent superiority of Stainless Steel and will settle for nothing less than first-class quality. Here are some of the distinct advantages Stainless offers you: exceptional strength, excellent heat resistance, unsurpassed corrosion resistance and lasting beauty. Your designers can create lighter, stronger, more attractive products. In turn, your marketing men will find that anything made of Stainless Steel has a distinct selling edge, because people know that Stainless is a quality material. Stainless Steel may cost more but it is worth more. For Stainless Steel, call your nearest Steel Service Center. We welcome the opportunity to work with you to develop new uses and markets for Stainless Steel. Write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.



Stainless Steel engine powers turbojet fire trucks Seattle and San Francisco have two of the world's most modern fire trucks. Built by American-LaFrance, Elmira, N. Y., they are powered by turbojet engines that weigh only 320 pounds yet generate 330 horsepower. (A piston engine of the same horsepower weighs 2,650 pounds.) Stainless Steel is used here for shafts and turbine blades and in the exhaust stack. Because of Stainless Steel's excellent heat-resisting properties, it's used inside the engine where the temperature reaches 1,200 °F. The stack is Stainless Steel insulated with fiberglass, and will never have to be painted. American-LaFrance is using more Stainless Steel every year for added strength, corrosion resistance and better appearance. Fire trucks must give many years of service under the most demanding conditions, so it is no wonder strong Stainless Steel is being used more often in their manufacture.



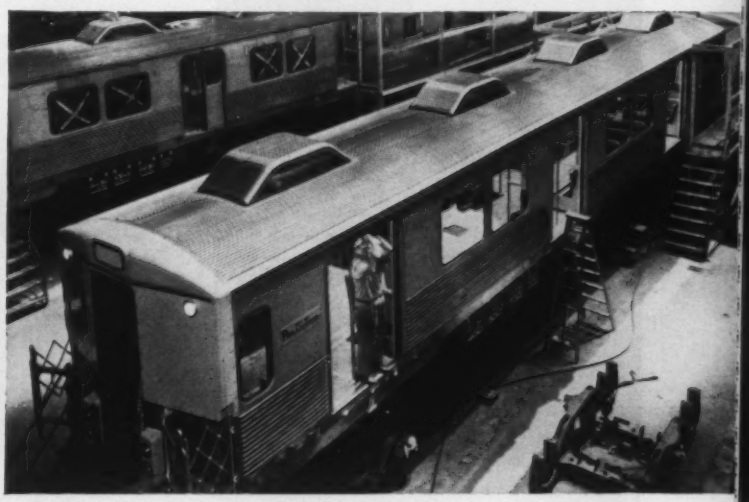
Stainless Steel farm-chemical tanks outlast others 10 to 1 Liquid-chemical fertilizing is widely used on well-managed farms. One problem farmers faced was excessive corrosion from strong chemicals. Solution: tanks of Stainless Steel. Stainless tanks outlast other types 10-1, and they save the farmer time, work and money because they don't corrode and clog up. Tanks, lines, valves, booms and nozzles of Stainless Steel wash clean in jig time and last far longer than other materials.



This mark tells you a product is made of modern, dependable Steel.

Another first for Texas: world's tallest Stainless Steel flagpoles

These 100-foot Stainless Steel flagpoles are the world's tallest. They stand in front of the First City National Bank Building in Houston, Texas. They were fabricated by John E. Lingo & Son, Inc., Camden, New Jersey, and were built to withstand sustained winds of 150 mph. Because they are Stainless, these poles won't corrode and will never need to be painted. They will stand straight and handsome for generations because they're strong as only steel can be. In short, high standards demand high standards.



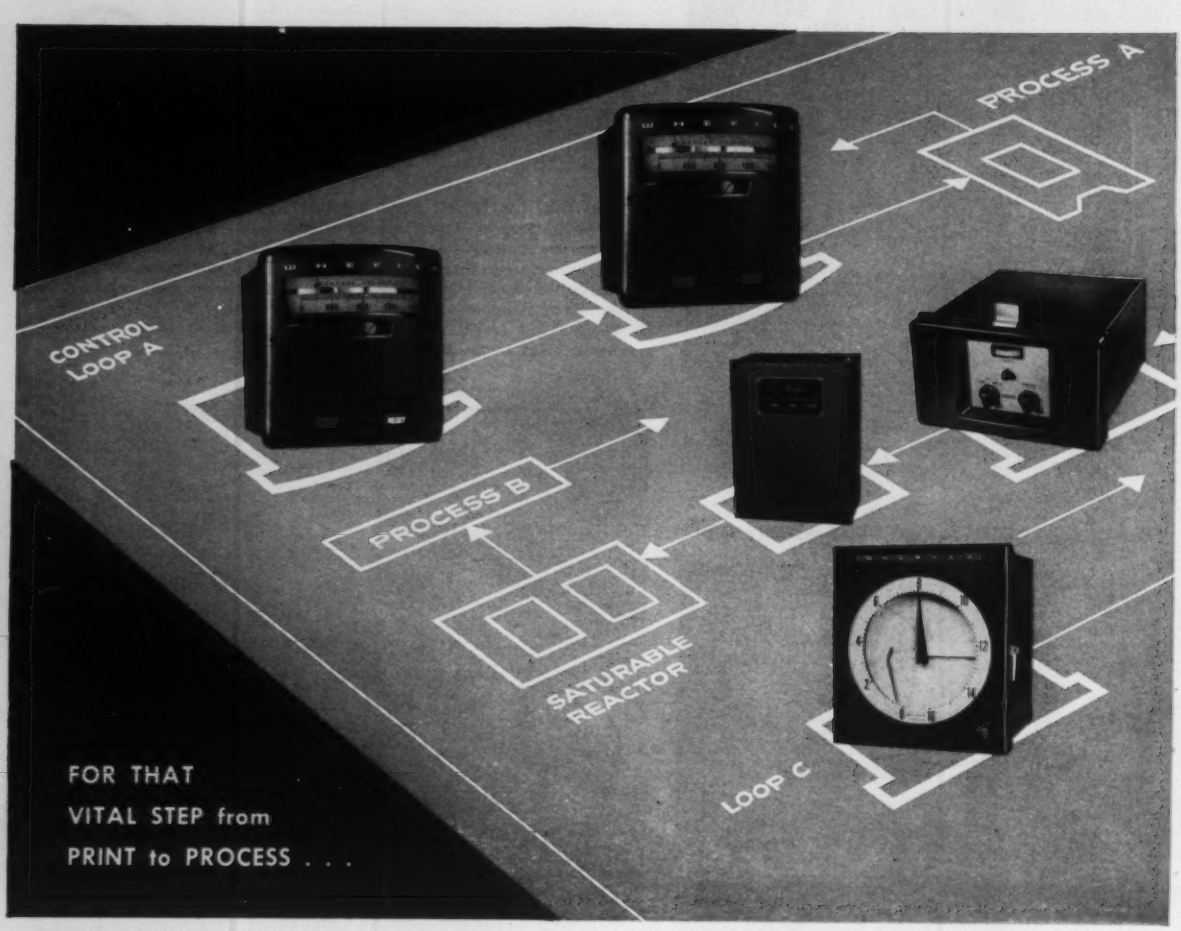
Stainless commuter cars save Philadelphia millions Philadelphia has installed a fleet of sleek new Stainless Steel subway-elevated cars built by the Budd Company, Philadelphia, Pa. The city figures the Stainless cars will save some $65,000,000 over the depreciated lifespan of the fleet because they are lightweight, don't require as much power, will need little or no outside maintenance, and will undergo almost no hidden structural deterioration because Stainless Steel resists corrosion so well. All 270 cars in the fleet are now running, and Stainless Steel will keep them looking brand-new for years through all kinds of weather.

Stainless Steel brightens new Union Carbide Building One of New York's newest office buildings, and one of the most attractive, is the Union Carbide Building. It rises 52 stories over the city and took nearly three years to erect. It owes much of its beauty to curtain-wall panels of Stainless Steel, which will stay attractive through the years because of Stainless' superior corrosion resistance. A passing shower will keep them clean and attractive. More and more, long-lasting Stainless Steel is being used in the most modern architecture because of its strength and corrosion resistance. Architects: Skidmore-Owings & Merrill, New York, N. Y.

United States Steel

USS

TRADEMARK

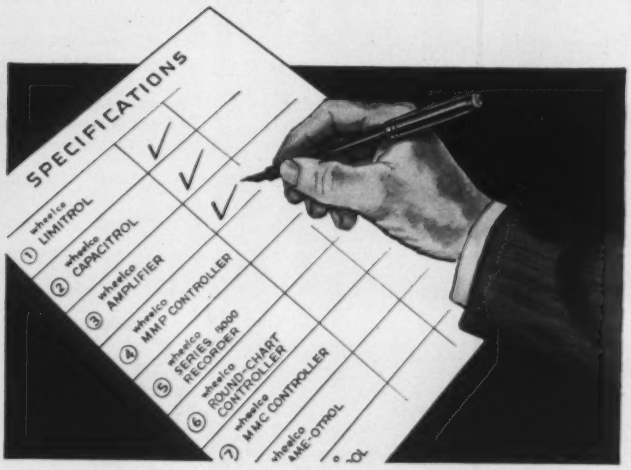


Specify Barber-Colman

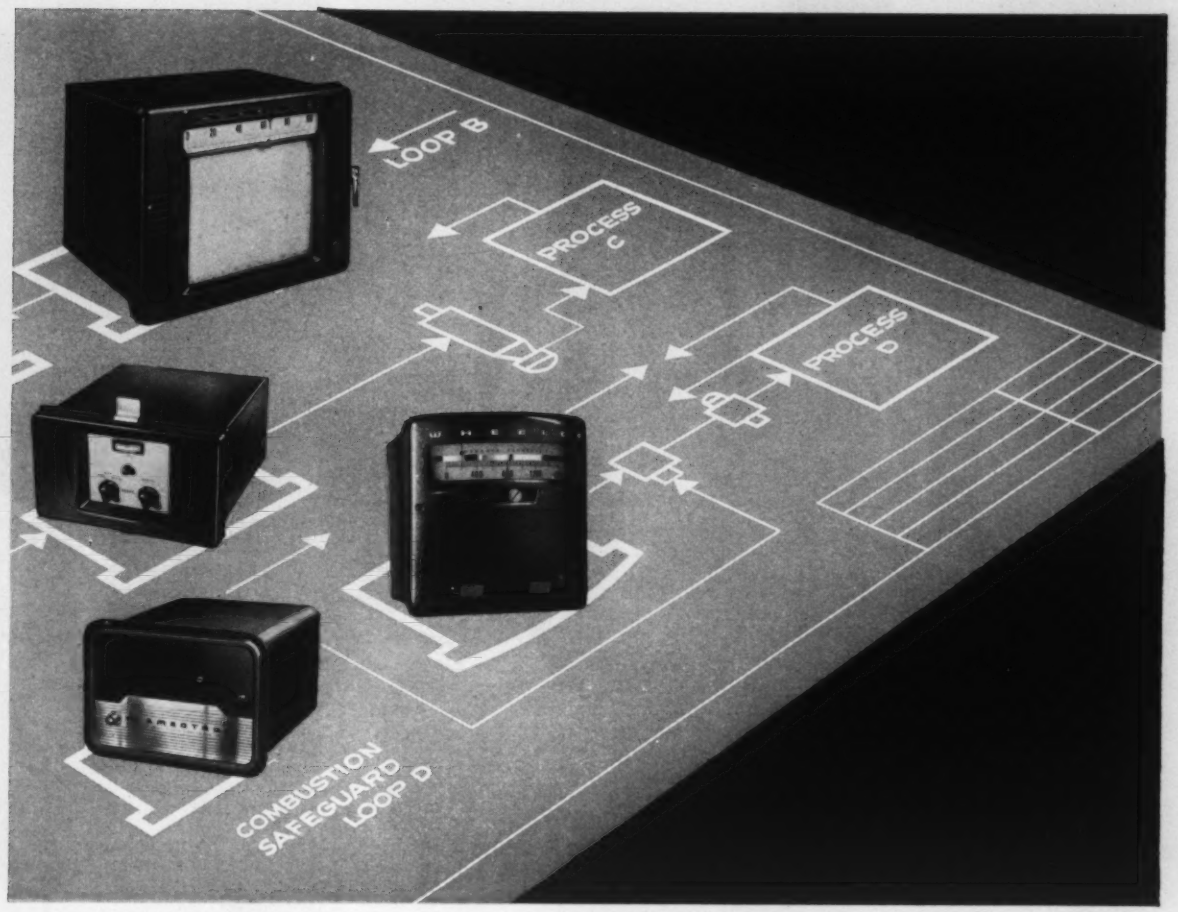
BARBER COLMAN

. . . in the planning stage

Barber-Colman Engineers can help you with early planning. Their knowledge of instrumentation can save you time and money. Suggestions on economical and efficient system control are yours for the asking.



Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components •



Process Control Systems

You can rely on Barber-Colman to implement your ideas for the best in process control • a broad line of flexible accurate instruments • a solid reputation for instrument dependability • experienced engineering with twenty-five years of process instrumentation • nation-wide service network of offices, staffed by skilled engineers • modern plants, production techniques, and a dynamic research and development program. Talk to the man who brings these advantages with him — the Barber-Colman Sales and Service Engineer. He will help make the vital step from one-dimension planning to three-dimension reality. Why not call him today?

BARBER-COLMAN COMPANY

WHEELCO INDUSTRIAL INSTRUMENTS DIVISION

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Rockford, Illinois, U.S.A.

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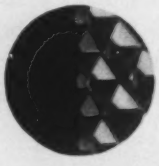
Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

BAY STATE MOUNTED WHEELS

set a new standard

Bay State has just completed a concentrated research and engineering program designed to make Bay State mounted wheels the finest available anywhere. Results are paying off for users in more uniform grinding action . . . easier operation . . . and virtually complete elimination of defective materials and workmanship. These wheels are as nearly perfect as the most advanced abrasive technology can make them.

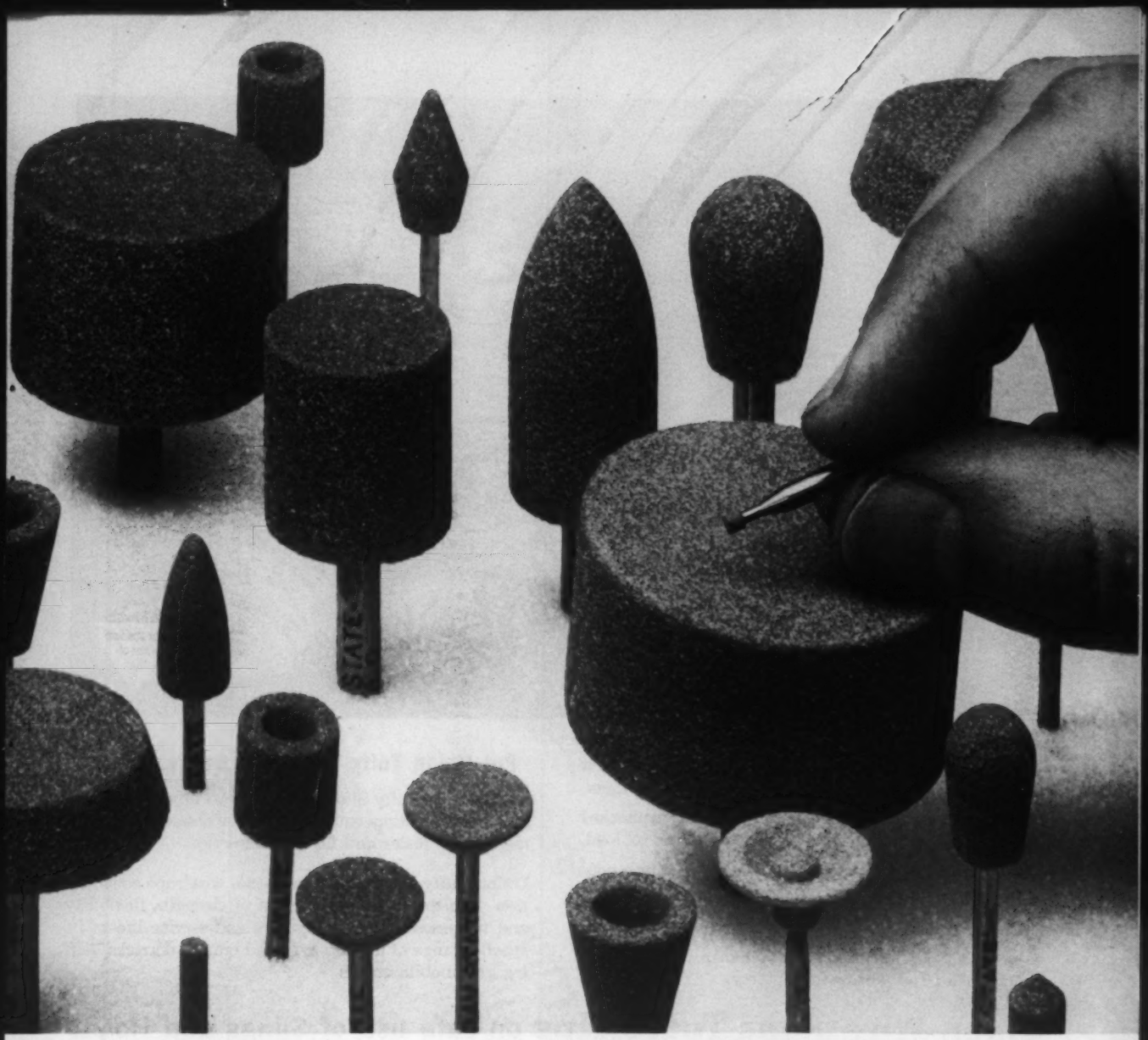
POSITIVE WHEEL-TO-MANDREL BOND Deeply knurled mandrel ends and specially formulated bonding material weld wheel and mandrel into a single, rock-solid unit. Constant, rigid quality control tests are made to check this Bay State feature.



SUPER-ACCURATE CONCENTRICITY Every wheel is molded oversize and then *ground to shape on its own mandrel* so that it *automatically* becomes perfectly symmetrical and is perfectly concentric with the center of the mandrel itself. *Result:* Every wheel runs true from start to finish . . . no breaking in required . . . no hard spots, no soft spots, the whole wheel does a 100% job of grinding right down to the mandrel.

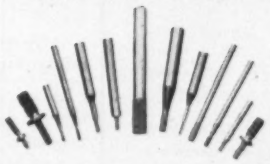
BAY STATE
WHEELS of PROGRESS

BAY STATE



# of excellence for the industry

MAXIMUM MANDREL UNIFORMITY Mandrel diameters are uniform to very close tolerances. No fumbling when operator changes wheels because new wheels can be locked into place with a minimum change in the collet or chuck setting.



COMPLETE INVENTORY IMMEDIATELY AVAILABLE Hundreds of different combinations of shape, grit, size, porosity, bond and mandrel size are in stock, ready to be shipped to users immediately. Bay State's 30-page catalog makes it simple to choose the specs you need for any job.

For special mounted wheels, call your Bay State, direct or distributor, representatives. They are abrasive specialists. *Better grinding at lower cost . . . that is their business.*

Bay State Abrasive Products Co.
Westboro, Mass.

Please send me the new Bay State Mounted Wheel catalog with full technical information on the best mounted wheels available to industry.

Company _____

Name _____

Address _____

City _____ *State* _____

ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.

Putting an ill-fitting set of harness on a team was all it took to cause an old time horseman to commit mayhem.

Maiming of persons can also result from haphazard harnessing of hoisting equipment horsepower to load.

The patented 9-part machine-braided wire fabric construction of Union Tuffy Slings gives you strength you can trust on any load for which the various sizes and types are rated. It also gives you hard-to-kink and easy to unkink flexibility to enable your men to sling loads faster, easier and with greater safety.

Put Union Tuffy® Hoist Line On Your Team

Hook Union Tuffy Slings onto Union Tuffy Hoist Lines and your hoisting equipment is harnessed to handle more loads faster and for longer service.

Union Tuffy Hoist Line is a special wire rope construction with the right combination of strength, flexibility and toughness for greater safety and service life in its specific range of uses on overhead cranes, derricks, stiff leg and mobile cranes.

Union Wire Rope Tuffy® Tips on safe use of Slings and Hoists

Safety in Hoisting Saves Costly Injuries

During a recent 12-month period, lost-time back injuries reported in one state (California) totaled 32,643. Lost-time injuries caused by strain or over-exertion: 24,639.

A high price to pay—in misery and money—for lifting, pushing or carrying loads. Medical aid and compensation costs of materials handling accidents run far into the millions every year. Proper hoisting equipment, properly used and maintained, is one important answer to this problem.

Free! Two Valuable Tuffy Handbooks

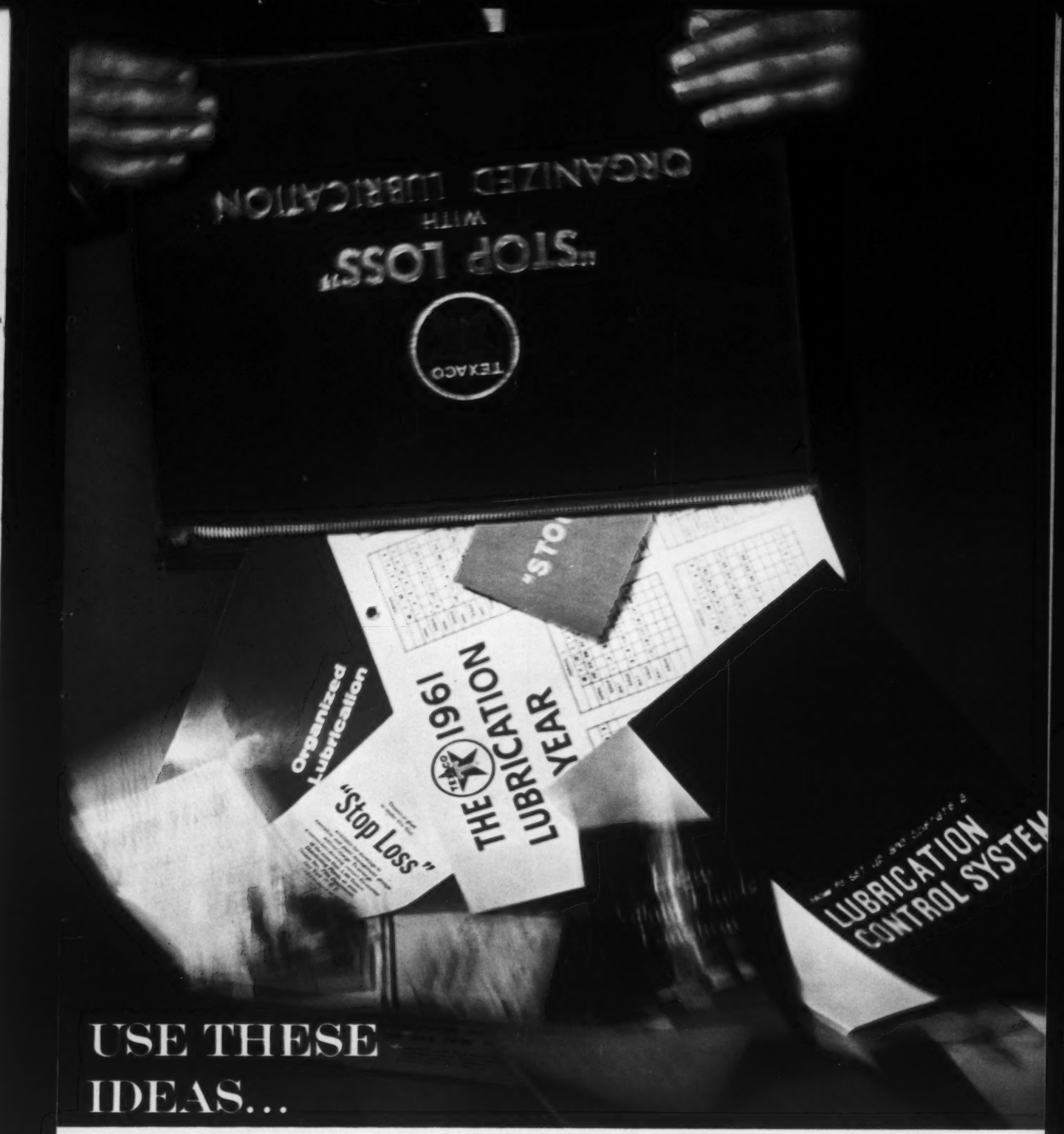
1. "Tuffy Tips." Gives many other safety hints. Also tells how proper fittings and correct use of slings and wire rope can lengthen service life. Chock-full of do's and don't's to save money, time and work.

2. "Tuffy Sling Handbook." Tells all about slings from A to Z. Contains helpful data on the selection and use of slings—types, dimensions, weights, fittings, rated loads, safety-approved signals.

5-61

Write Union Wire Rope, Armco Steel Corporation, 2160 Manchester Avenue, Kansas City 26, Missouri

ARMCO Union Wire Rope

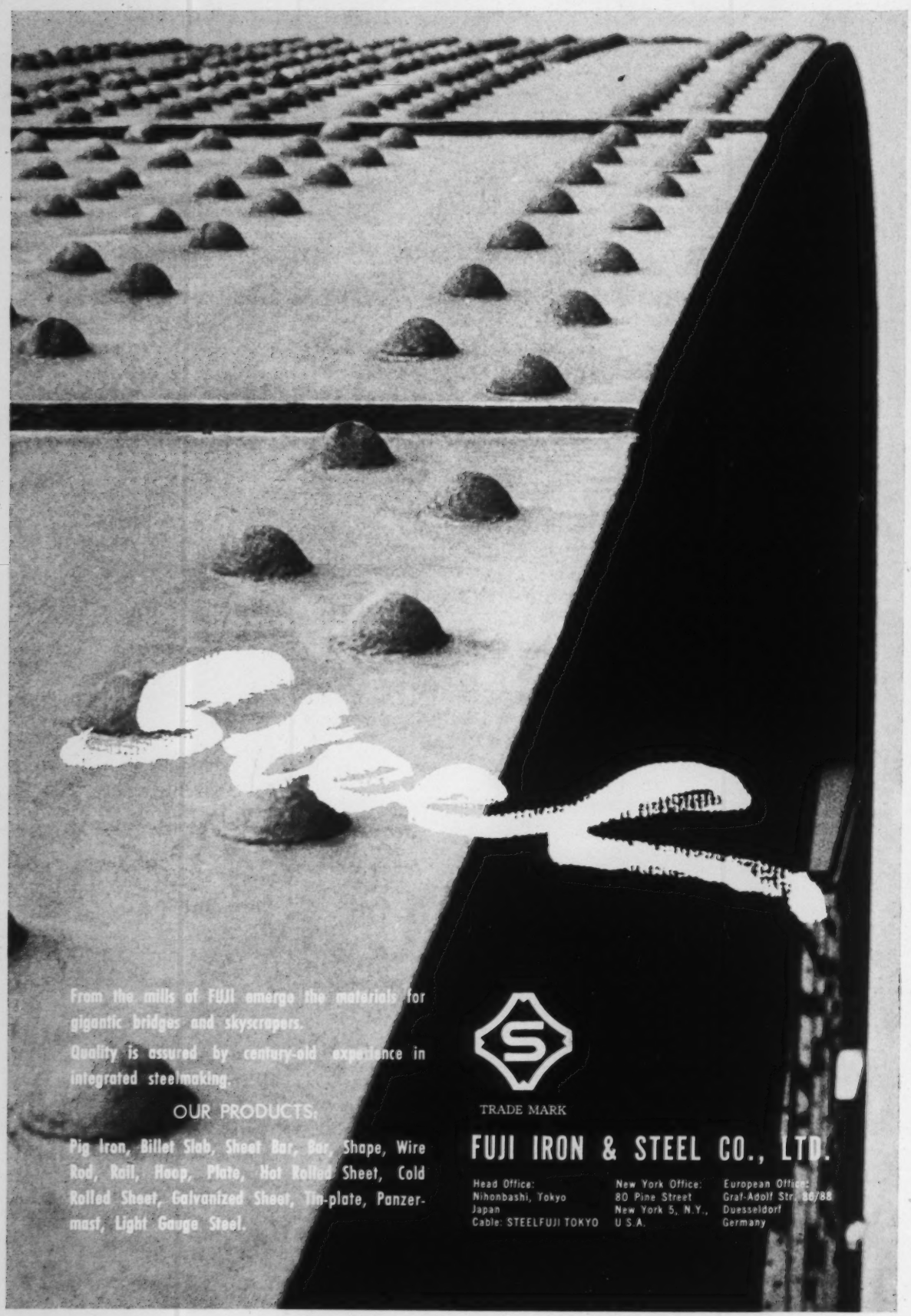


USE THESE IDEAS...

TO GET UP TO AN EXTRA 4% NET PROFIT

Out of the Texaco man's briefcase comes a wealth of ideas for cost control through organized lubrication—Texaco's "Stop Loss" Program. Managers in many industries are already using these plans to reduce losses in three important areas: production, maintenance and purchasing. Their savings go directly into profits—the average is a 4% gain in their net. Get the facts. Write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. S-191

TEXACO



From the mills of FUJI emerge the materials for gigantic bridges and skyscrapers.

Quality is assured by century-old experience in integrated steelmaking.

OUR PRODUCTS:

Pig Iron, Billet Slab, Sheet Bar, Bar, Shape, Wire Rod, Rail, Hoop, Plate, Hot Rolled Sheet, Cold Rolled Sheet, Galvanized Sheet, Tin-plate, Panzermast, Light Gauge Steel.

TRADE MARK

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Japan
Cable: STEELFUJI TOKYO

New York Office:
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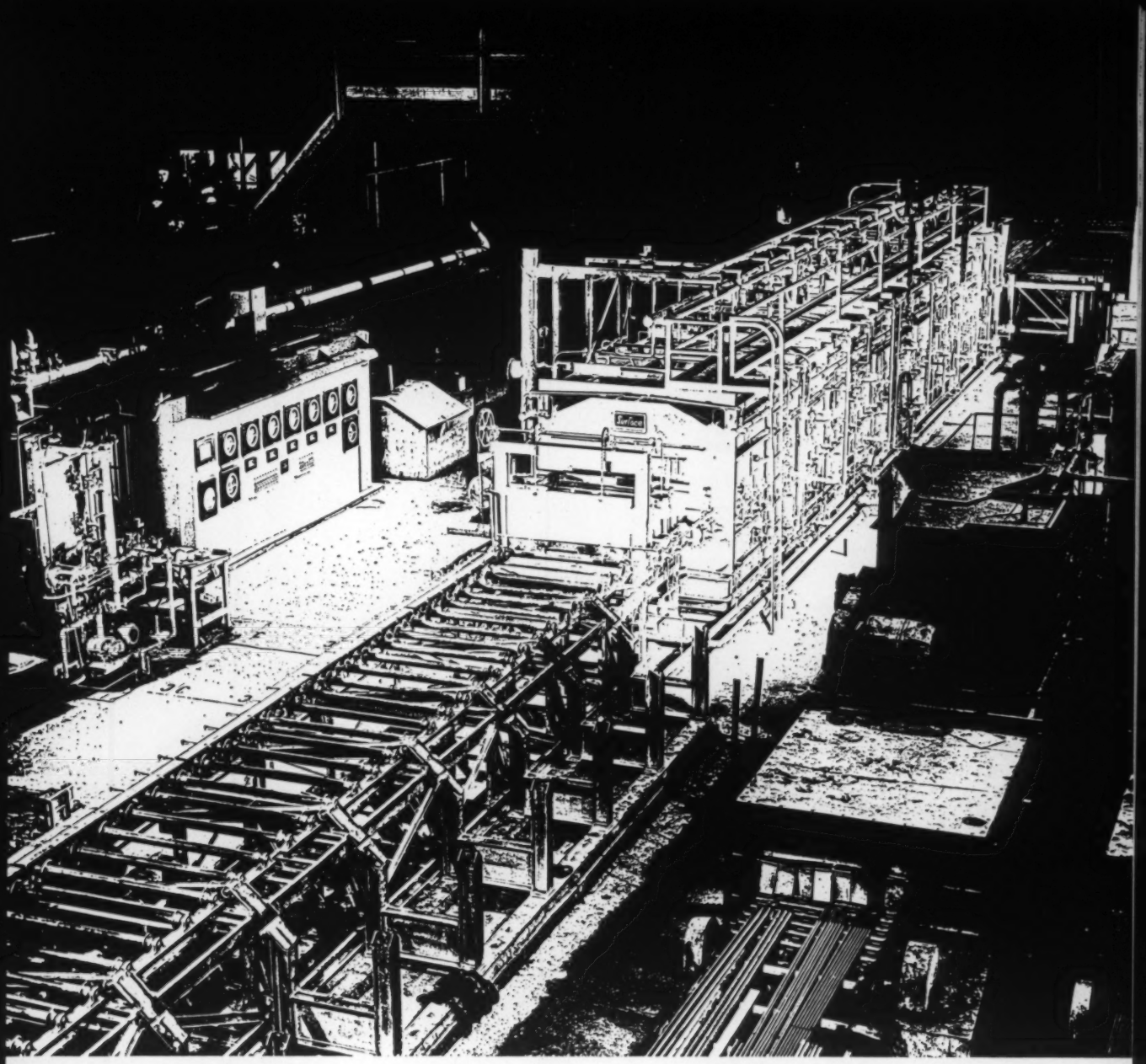
New York 5, N.Y.,
U.S.A.

European Office:
Graf-Adolf Str. 86/88
Duesseldorf
Germany



Courtesy of Jones & Laughlin Steel Corporation

Produces more steel and happier customers: Both Jones & Laughlin Steel Corporation and its customers have gained from this Surface furnace. For J&L, it affords continuous high production, uniformity through every bar in each load, accurate repeatability, and a variety of heating-cooling cycles. For J&L's customers, it delivers bar stock with the uniform microstructure which improves machining efficiency and profits. Address inquiries to 2408 Dorr St., Toledo 1, Ohio.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR

A gallery of modern reversing mills... by BLISS SALEM, OHIO

Versatile and fast, Bliss reversing 4-high cold reduction mills roll much of the world's strip steel. Some typical recent installations are shown here. Write today for our 84-page portfolio of rolling mills and auxiliary equipment—Bulletin 40-B.

BLISS
SINCE 1857

Bliss is more than a name... it's a guarantee

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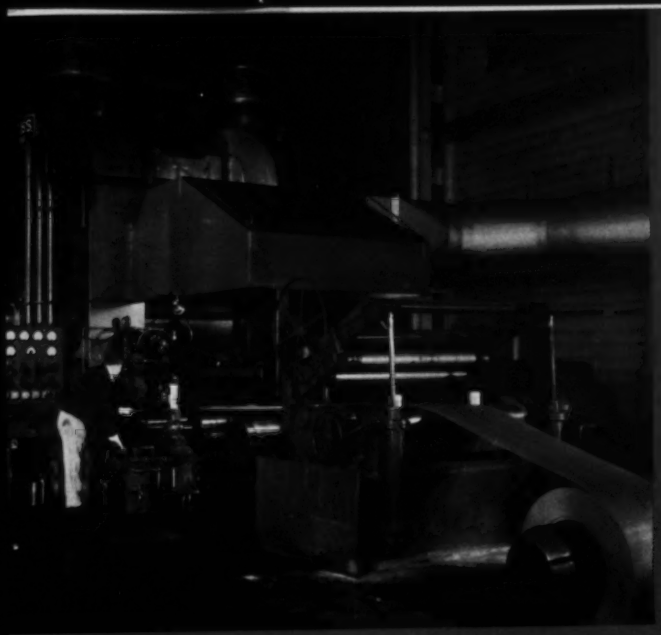
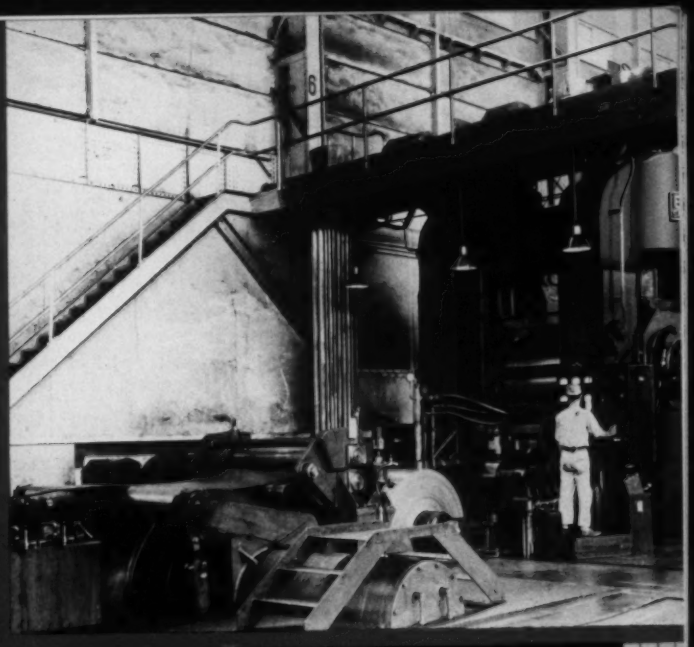
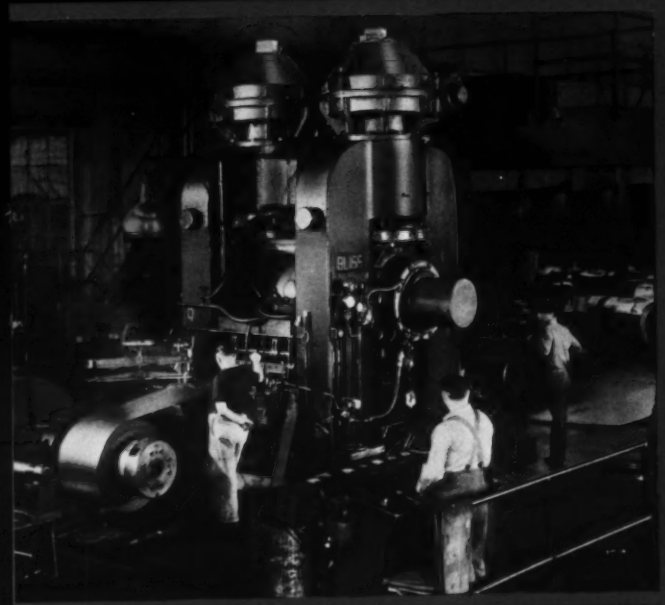
Subsidiaries: E. W. Bliss (Canada) Ltd.; E. W. Bliss (England) Ltd.; E. W. Bliss Co. (Paris) France; E. W. Bliss-Henschel G. m. b. H., Düsseldorf, West Germany; The Matteson Equipment Company, Inc., Poland, Ohio







Cranes Handle MILLIONS OF POUNDS Monthly

Cleveland Tramrail Cranes *Keep Going at High Pace in* LARGE TEXAS STRUCTURAL STEEL PLANT

Bundles of reinforcing rod are easily lifted out of storage with the Tramrail cranes and delivered to the forming area shown here. The crane illustrated also handles rod out of incoming railroad cars and delivers it to storage quickly. The crane has two electric hoists each of 5000 lbs. capacity. Crane span is 70 feet.

Handling a heavy pack of steel plates. Aisleways are not of concern when Tramrail cranes are used; in fact, most usual aisle space can be devoted to storage and other purposes. The crane cabs were fabricated by Central Texas.

THERE is little idle time during a working day for the Cleveland Tramrail cranes at Central Texas Iron Works Co., Waco, Texas. Both of the cab-operated cranes in the Shear and Reinforcing Rod Storage Building generally handle 3,000,000 lbs. each of steel rod, plate and miscellaneous items per month. This means many lifts and much travel in all directions. Eight hours is the standard working day.

Central Texas is one of the largest structural steel fabricating companies in Texas. They fabricate beams, trusses, tanks, stacks, etc., also form concrete rod for buildings and bridges.

Central Texas recognizes the advantage of materials handling equipment designed and built by specialists in this field. For many years they have used a large number of Cleveland Tramrail hand-propelled cranes with electric hoists in an old fabrication area. The cranes illustrated here were installed in 1954, when they enlarged the plant. The Cleveland Tramrail equipment has proven a big factor in facilitating handling and has been very satisfactory.

WRITE FOR FREE COPY of Engineering and Data Booklet No. 2008. Packed with valuable information. Profusely illustrated.

CLEVELAND TRAMRAIL
Overhead Materials Handling Equipment

TARCA TRACK *assures more years of smooth service*

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7860 E. 290 ST. • WICKLIFFE, OHIO

airborne crane built 500 pounds lighter with USS TRI-TEN High-Strength Low-Alloy Steel

Lightweight crane built strong with USS TRI-TEN High-Strength Low-Alloy Steel. Designed for the U.S. Army Corps of Engineers, Ft. Belvoir, Virginia. Builder: Koehring Co., Milwaukee, Wisconsin.

This air transportable, air droppable U.S. Army crane had to be strong enough to lift 7 tons but light enough to be parachuted into a combat area. The Koehring Company of Milwaukee, Wisconsin, solved the problem with USS TRI-TEN High-Strength Low-Alloy Steel.

By using USS TRI-TEN Steel in the turntable, the lower works of the cruiser, and the boom, Koehring designers used only two tons of steel . . . with a clear saving of 500 pounds. Strength was not sacrificed because USS TRI-TEN Steel has a minimum yield point of 50,000 psi.

USS TRI-TEN Steel is well known as one of the most weldable and toughest high-strength low-alloy steels in the industry. Its superior notch toughness at low temperature makes it ideal for all-weather mobile equipment. TRI-TEN Steel has excellent weldability, good resistance to abrasion, and high atmospheric-corrosion resistance.

For other military vehicles, United States Steel makes extremely tough, rolled alloy armor plate, in addition to a complete line of high strength steels, "T-1" Constructional Alloy Steel, Stainless Steels and carbon steels. For more information, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS, "T-1" and TRI-TEN are registered trademarks

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal & Iron Division • United States Steel Supply Division • United States Steel Export Company

This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

Towering five stories high, this vertical cooling tower forms a vital part of United States Steel's spectacular new heat treating facilities shown on the next two pages. The forging is placed on a stool which can be rotated. Cooling is accomplished by the use of air or water, as required.

PLEASE LIFT FLAP

This mark tells you a product is made of modern, dependable Steel.

From the cradle to the lathe

New vertical heat-treating facilities handle world's largest rotors

How would you handle a forging that starts out as a 521,000-pound ingot and ends up as one of the world's largest generator rotors weighing 114 tons?

To accommodate forgings like this at its Homestead Works, United States Steel has installed seven new vertical heat-treating furnaces, a cooling tower and a unique "upender" cradle which tilts these large forgings with ease to a vertical position for crane pick-up. The new furnaces rise 25 feet above, and extend 25 feet below the floor. They can accommodate turbine and generator rotors with an overall length of 45 feet maximum and a maximum body diameter of 60 inches.

The vertical heating and cooling equipment allows large rotors to be uniformly heat treated in the upright position after they have been forged and machined.

One of the outstanding jobs for the new equipment was heat treating some of the largest generator rotors ever made. One of these is shown below being machined in the 120-inch lathe after it received its heat treatment. (The smaller rotor suspended from the crane in the big picture at the left is a different forging.)

In forgings such as these, heating and cooling operations must be carefully controlled to assure proper structure in the steel. Using the skill that only time and experience could give him, Al Sauer, a veteran in our Homestead Works, supervises the careful heat treating of these forgings. After heating, they are transferred to the 50′ high cooling tower where they are cooled at controlled rates. Then they go back for further machining, testing, boring, more heat treating, final machining, sonic inspection, and shipment.

United States Steel makes many forgings for all kinds of applications. Here, a team of experts supervises and controls every step of forging production. Let them handle *your* next order. For more detailed information about USS Quality Forgings, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

United States Steel Corporation, Pittsburgh • Columbia-Geneva Steel, San Francisco • Tennessee Coal & Iron, Fairfield, Alabama
United States Steel Export Company

Shown here are four of the seven new vertical heat-treating furnaces, housed in a modern 125 foot high building, that give United States Steel the ability to handle the largest generator and turbine rotor forgings that can be made.

One of the world's largest generator forgings being machined in our 120-inch lathe. After final machining, it weighed 114 tons.

USS United States Steel

TRADEMARK

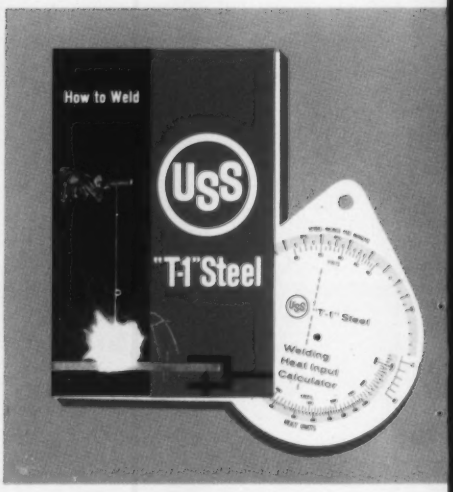
Send for new movie, "How to Weld USS 'T-1' Steels"

This new 18-minute, 16mm color motion picture shows concisely the practices involved in welding USS "T-1" Steels. If you are fabricating "T-1" Steel in your shop, this film and copies of the booklet will be a big help in demonstrating the proper technique to your welders. Fill out the coupon below and indicate the number of booklets you will need.

Included in the booklet is a handy welding heat-input calculator that helps a welder choose the proper welding machine settings. The film, together with the booklet, will help every welder to weld USS "T-1" Steels readily and successfully.

We'll gladly lend you the film and furnish enough free copies of the booklet and heat-input calculator for your shop personnel. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division
National Tube Division • Tennessee Coal and Iron Division • United
States Steel Supply Division • United States Steel Export Company



United States Steel

USS

United States Steel, Room 6384
525 William Penn Place
Pittsburgh 30, Pennsylvania

Gentlemen:

Please lend me your 16mm color, sound movie, "How to Weld USS 'T-1' Steels." Also, send me_____booklets of the same title. I understand there is no obligation.

Name_____

Title_____

Company_____

Address_____

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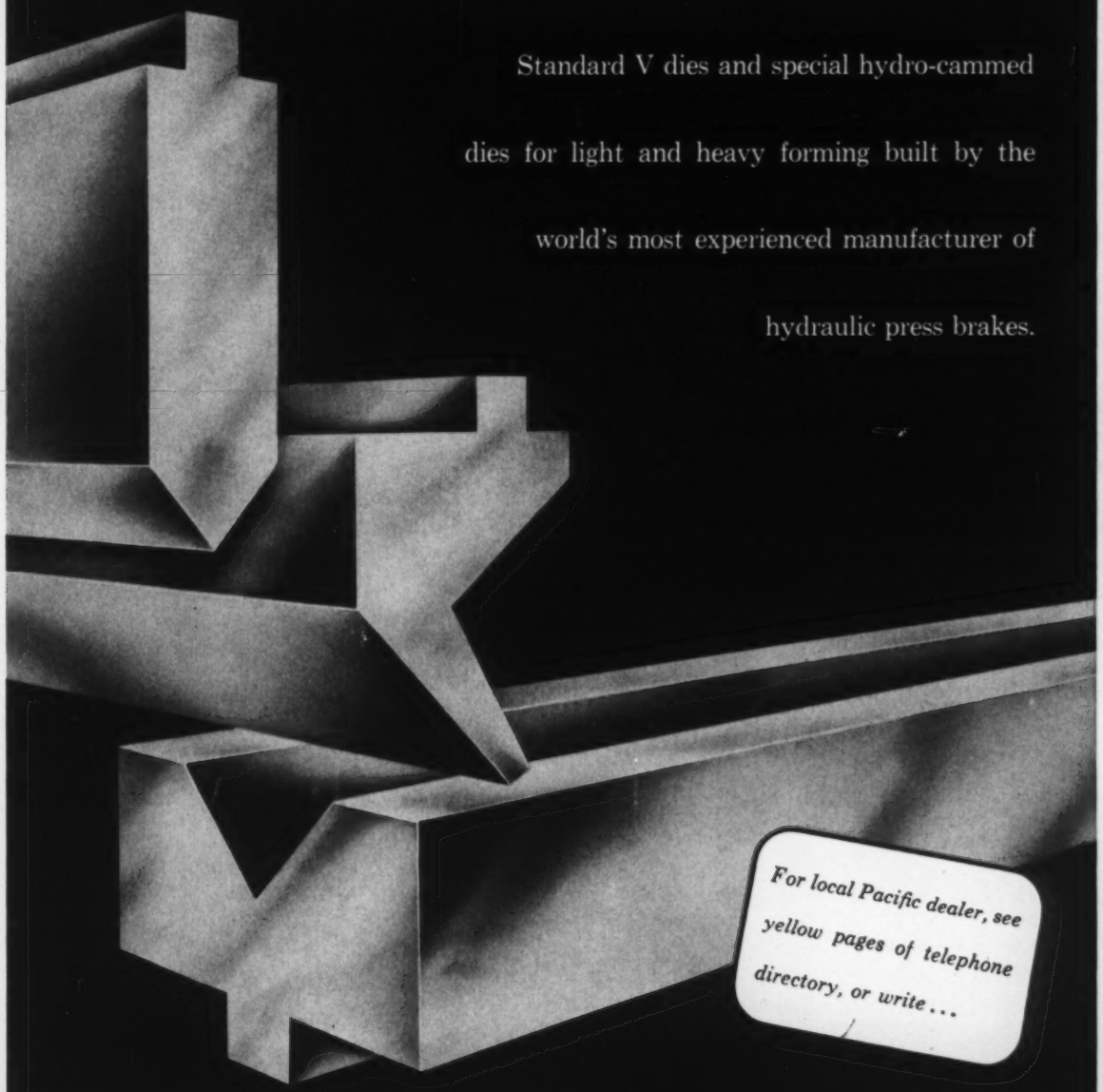
Fast nationwide service on

PRESS BRAKE DIES

Standard V dies and special hydro-cammed dies for light and heavy forming built by the world's most experienced manufacturer of hydraulic press brakes.



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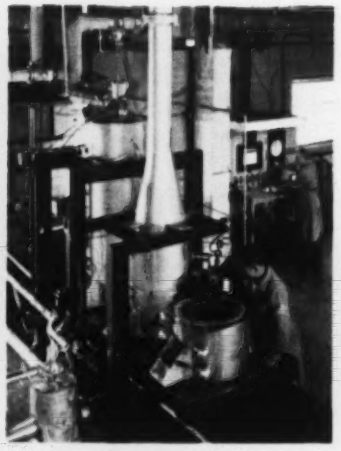
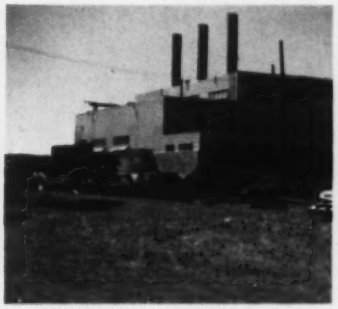


DOCKS: Large barge fleets dock at this steel company riverside facility to deliver raw materials or pick up outgoing shipments. Dravo pioneered cellular, sheet pile dock construction and has built them of all sizes for all types of industry. Dravo's 60 years' experience in heavy and marine construction can help you on projects such as docks, harbors, shafts, tunnels, foundations, water intakes. Check coupon below for information.

RESEARCHES: Dravo research explores agglomeration processes and establishes bases for plant design of complete pelletizing, sintering and briquetting facilities. Second Dravo-Lurgi ore pelletizing plant for a major metal producer is underway. Dravo-Lurgi iron ore sinter plants account for 45% of new U.S. capacity added in last 5 years. Mail coupon for facts.

CONCENTRATES: Interior of a Dravo-Lurgi magnetizing-roasting kiln, where low grade, non-magnetic ore is reduced to synthetic magnetite for separation by conventional equipment. Two pilot plants, one 10-ton per hour and one 2-ton per hour, are now in service in U.S. Use coupon for data on ore beneficiation processes.

HANDLES: 15-ton capacity ore bridge handles stocking and reclaiming needs of large steel producer's expanded yard. Dravo ore and coal unloaders and container cranes speed handling at mills, industrial plants, power stations, terminals and ports. For information on this equipment, check and mail the coupon.



BUILDS: One of five turn-key steam plants built for major auto maker. Other construction services include Dravo-Linde AG air and gas separation and Stora-Kaldo oxygen steelmaking plants; power and compressor stations; piping, machinery, pumping and water or waste treatment installations. Check coupon.

AGGLOMERATES: Total hearth area of 2,419 sq. ft. (13.17′ x 183.75′) makes this Dravo-Lurgi facility the world's largest single-strand sinter plant. Use coupon.

DRAVO

Dravo Corporation, 4780 Grand Avenue, Pittsburgh 25, Pa.

Please send me information on the following products and services

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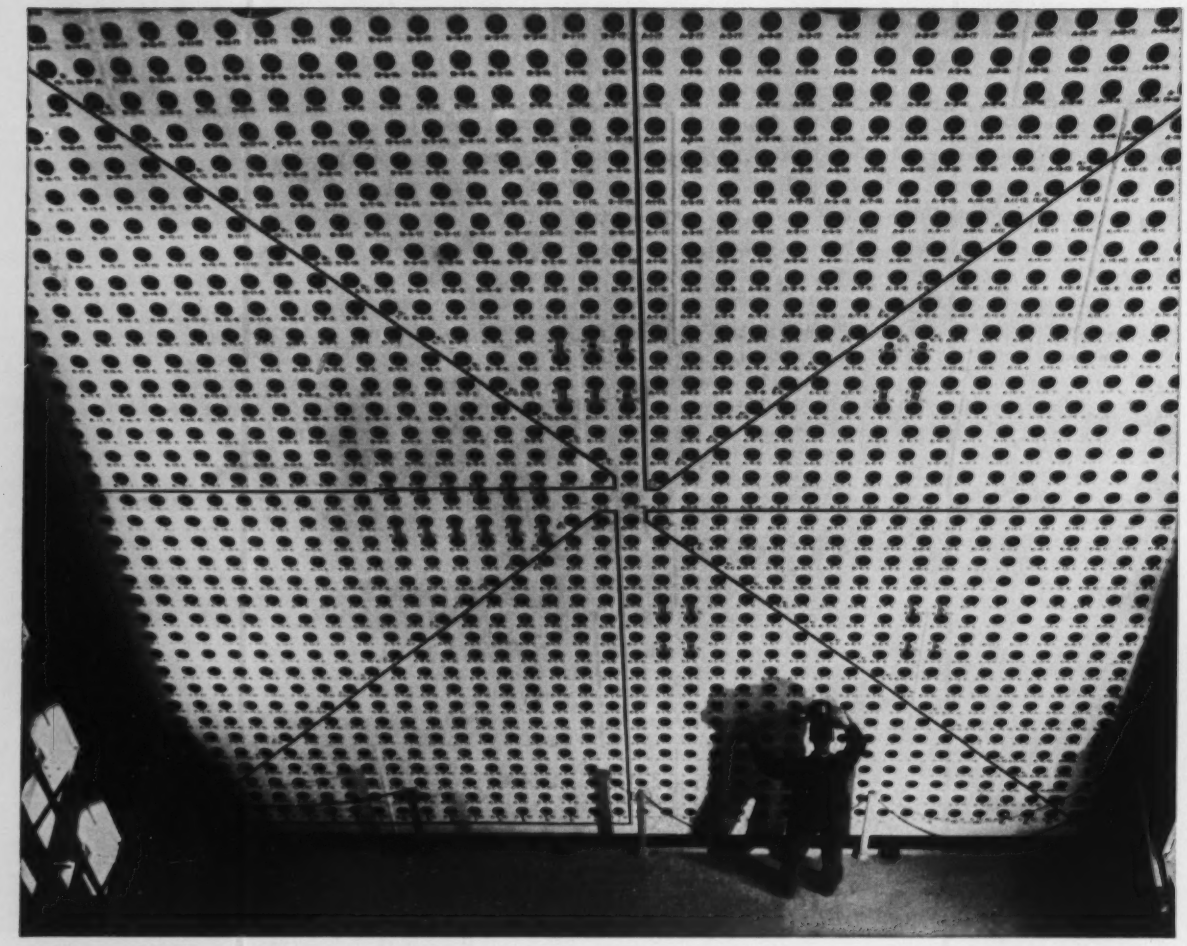


PRECISE TUBING HELPS CONTROL ATOMIC REACTOR

In the intense heat and radioactivity of nuclear reactors, there are many uses for precise tubing, manufactured under rigid quality control.

This is one of the many important applications for BISHOP'S complete line of tubing up to 1 inch OD, in stainless, nickel, super and exotic alloys—and glass-to-metal sealing alloys, clad metals and composite wires.

BISHOP also produces a vast line of platinum products and chemicals.

And BISHOP is unique because of its ability to *work these metals to such small, precise forms.*

Write for Bulletin No. 12, tubular products; or Catalog No. P-6, platinum products.

BISHOP

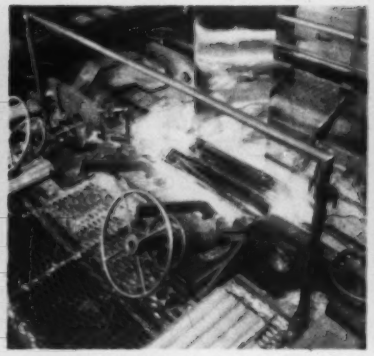
Tubular Products Division **J. BISHOP & CO.** *platinum works* MALVERN, PENNSYLVANIA

A JOHNSON MATTHEY ASSOCIATE "METALS FOR PRECISION AND PERFORMANCE"

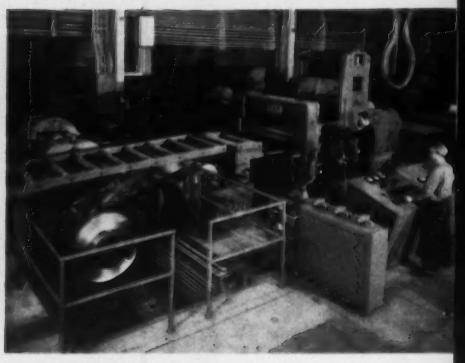
OFFICES: NEW YORK • PITTSBURGH • CHICAGO • ATLANTA • HOUSTON • LOS ANGELES

Wean Engineering
built the first
Wheeling-type
galvanizing line...
and the second...
and the third...
and the fourth...
in fact, all such lines
built–and being built–
for the
Steel Industry

Coils are welded and side-trimmed in the entry section for continuous line operation.



Strip emerging from the pot has a uniformly applied coating of zinc.



Galvanized steel is either coiled or sheared-to-length to meet customer requirements.

In 1953,

The Wheeling Process was developed for commercial production

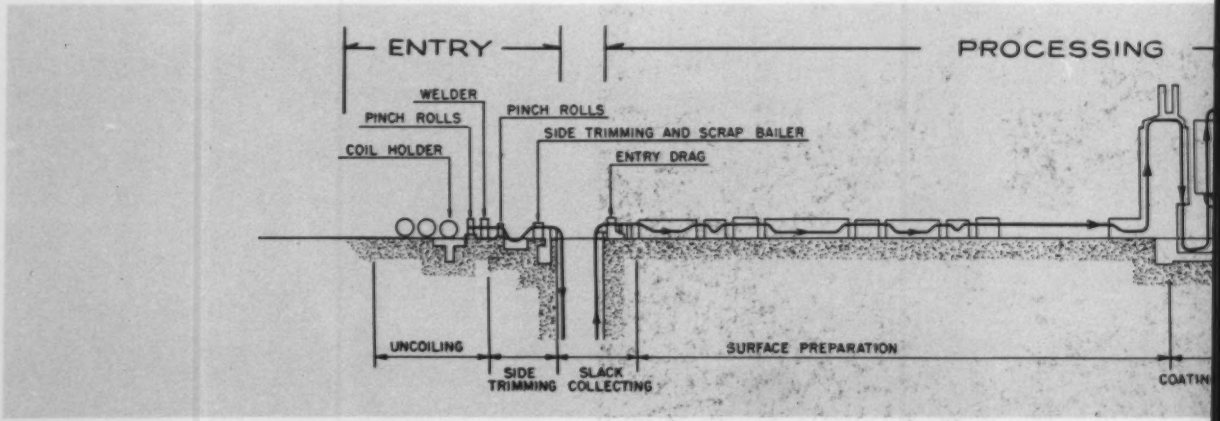
Before Wheeling Steel Corporation started up its No. 1 Continuous Strip Galvanizing Line—the first of its kind—at Martins Ferry in 1953, the firm's research department had spent years in extensive testing of the process, including the operation of a narrow pilot line.

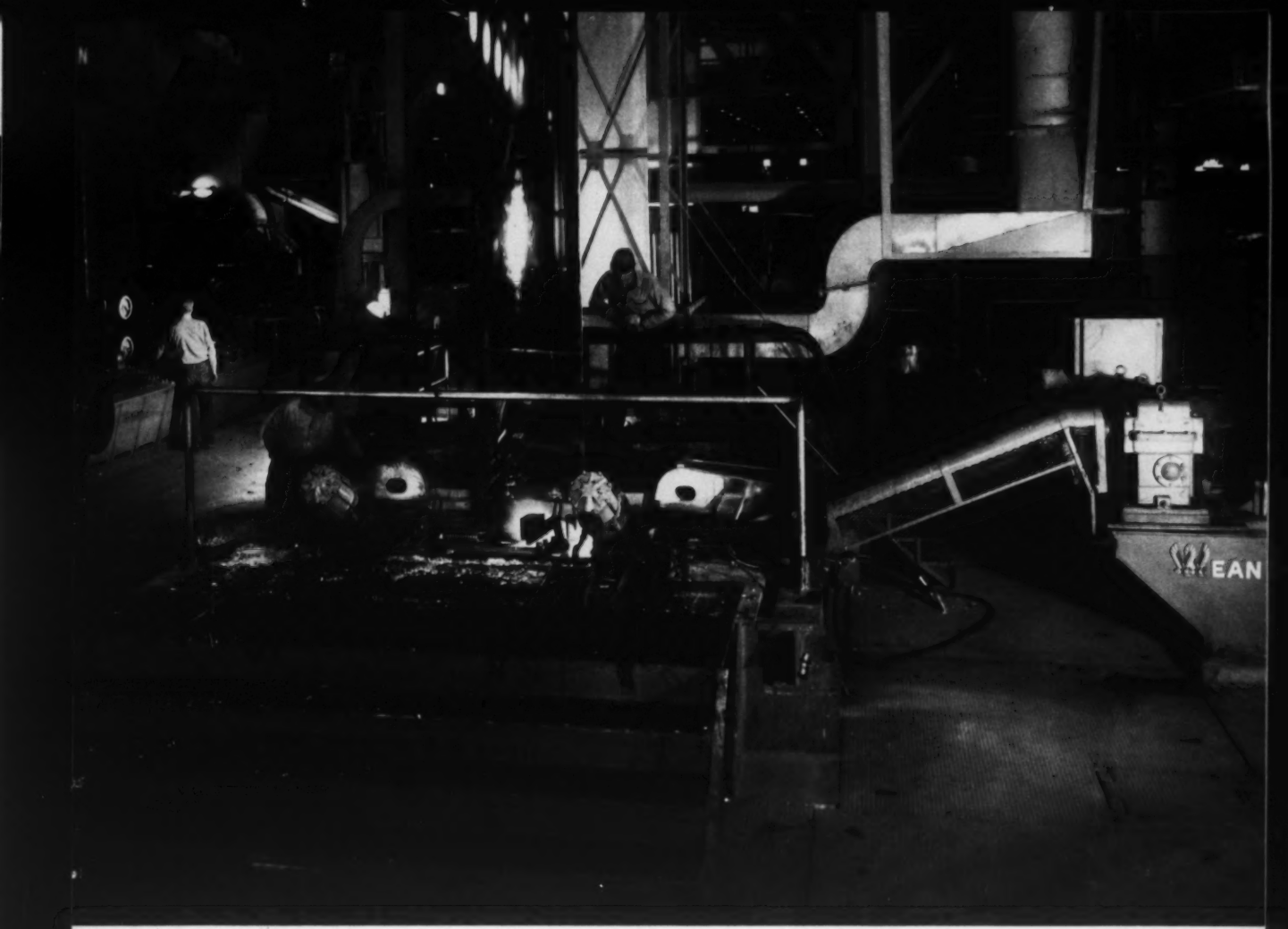
Wheeling's approach was a departure from the galvanizing lines already in production, in that the coils fed into the Wheeling line had already been annealed and temper passed. This meant that the metallurgical properties of the base metal were established before the galvanizing operation, with no adjustments in coating line speed required for various annealing cycles.

As shown below, the Wheeling-type galvanizing line is separated into three sections: entry, processing and exit. As in all continuous strip processing lines, these sections are separated by strip accumulators (either pits or mechanical looping devices).

The entry section's function is to provide a continuous supply of side-trimmed strip to the processing section. In the processing section, the strip is inspected, cleaned and fluxed, then coated with the desired thickness of zinc. After coating, the galvanized strip is chemically treated for whatever type of end product is desired.

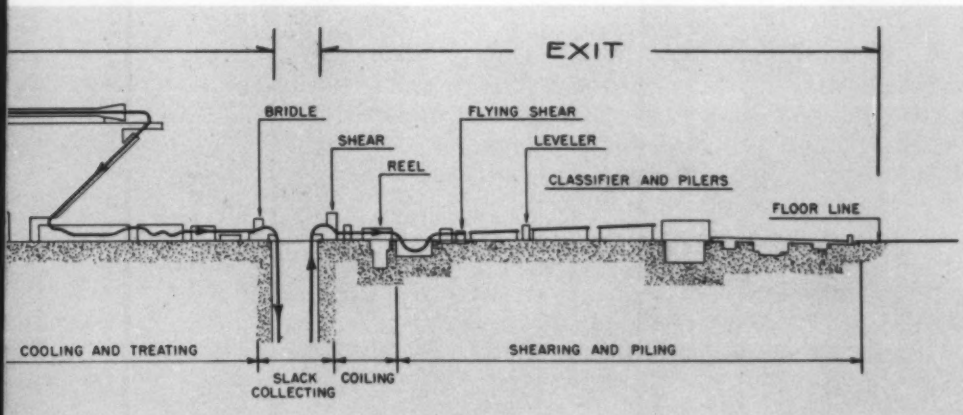
In the exit section, the strip is either recoiled or sheared into specified sheet lengths. The cut sheets are classified, with any unacceptable material being diverted into a reject piler, and prime sheet roller-leveled and automatically stacked.

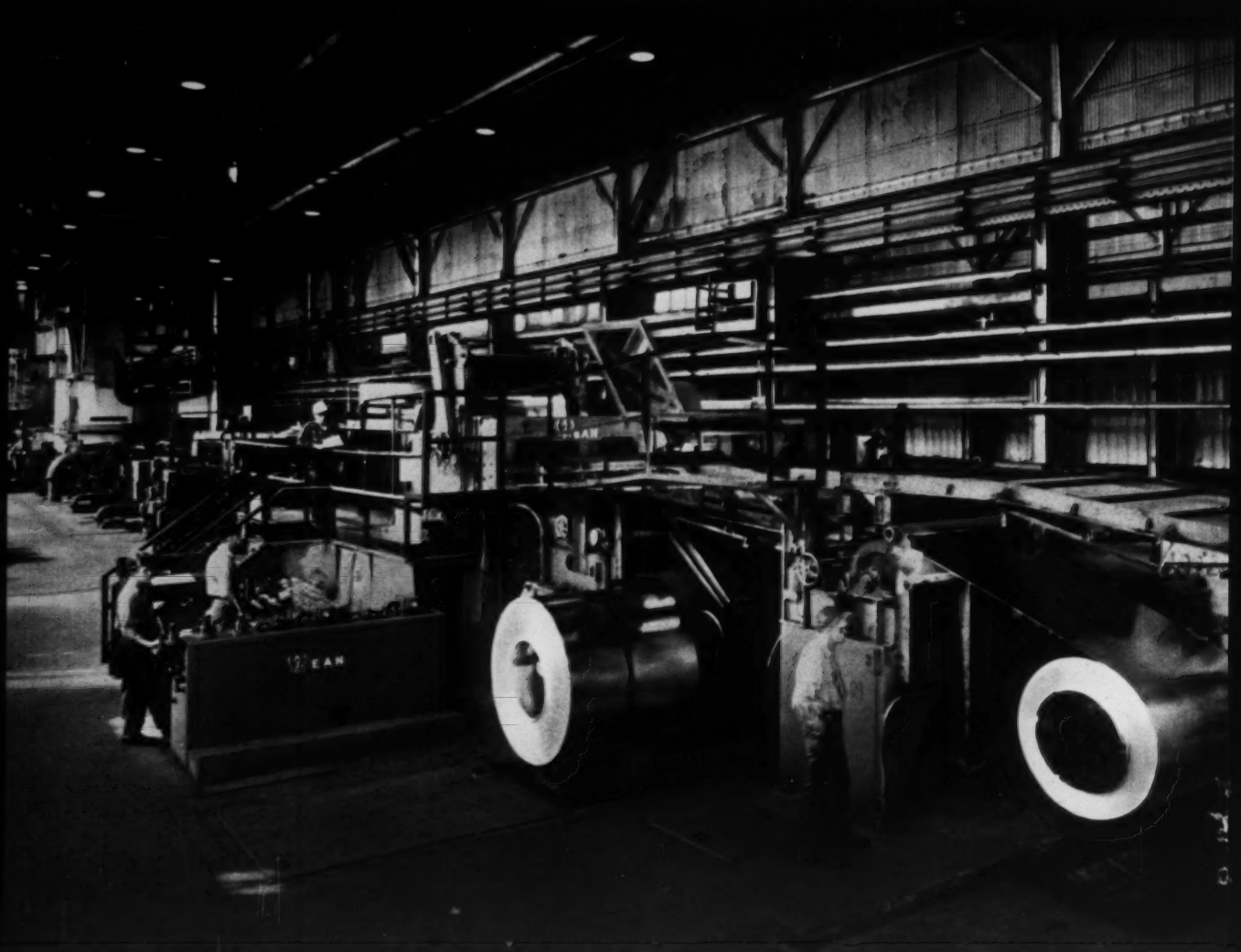




In 1955,

Wheeling installed its second Wean-built galvanizing line at Martins Ferry



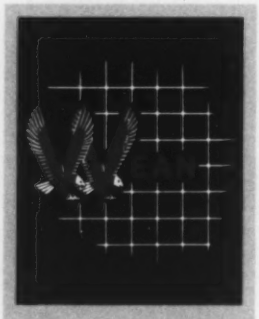


No. 1 continuous galvanizing line at Republic Steel Corporation's Warren, Ohio works. No. 2 line at this plant is under construction. Republic has a third Wean-built line at its Gadsden, Alabama plant.

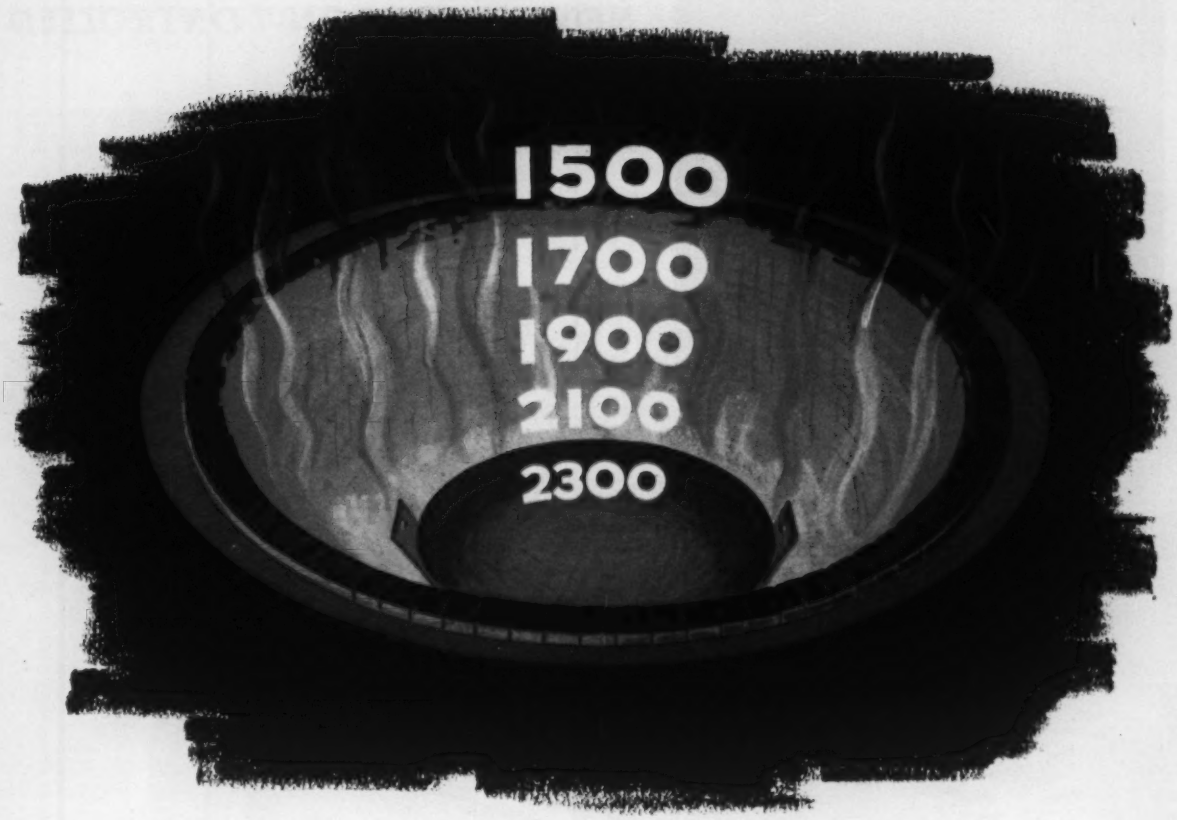
The Wean Engineering Company is proud to have had the opportunity to work in close association with the Wheeling Steel Corporation and its licensees in the design and construction of all Wheeling-type galvanizing lines.

Wean is also currently participating in the design and construction of the world's largest Wheeling-type galvanizing line, planned for Bethlehem Steel Company's Lackawanna Plant. This line will be capable of handling 70,000 lb. coils with a maximum O.D. of 75″ and a maximum strip width of 72″. Operating at speeds up to 300 fpm, the new line will produce a range of galvanized sheet from 8 through 30 gauges.

As in this particular phase of steel technology, Wean has played a dominant role in the development of improved, more productive sheet, strip and tin plate processing facilities for every major steel producer. This three-decade background of "creative engineering" experience is ready to serve you in meeting your production requirements.



THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO, U.S.A.



2300° HOT . . . *but not bothered!*

Retort made of HASTELLOY alloy X is removed from furnace after brazing cycle at 2300 deg. F.

RETORTS made of HASTELLOY alloy X and used for controlled-atmosphere brazing of rocket and missile parts at 2300 deg. F—last up to twice as long as retorts previously used. The alloy's high strength and resistance to oxidation and thermal shock make thinner walls possible. This in turn shortens heating cycles by 25 per cent . . . and cuts fuel costs by as much as 40 per cent.

Total savings during the 100-day lifetime of the retorts is about $1000—resulting from lower first cost, shorter heating cycles, 150 additional cycles per retort, and reduced costs for fuel and welding maintenance.

Resistance to stress, to thermal shock, to erosion, corrosion, and fatigue, are typical properties that make HAYNES alloys so extremely useful in jet engine turbine wheels, in ramjets, missiles, rockets, as well as industrial heat-treating applications.

Whether investment- or sand-cast, rolled, wrought, vacuum melted, or air melted, there's a HAYNES high-temperature alloy to meet your needs.

HAYNES ALLOYS

HAYNES STELLITE COMPANY

Division of Union Carbide Corporation
Kokomo, Indiana

Address inquiries to Haynes Stellite Company, 270 Park Avenue, New York 17, New York.

UNION CARBIDE

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METAL ROLLING
AUTOMATED BY GENERAL ELECTRIC

NOW . . . SILICON-CONTROLLED

New SCR drives from increase reliability,

RECTIFIER SYSTEMS FOR STEEL MILLS

General Electric reduce maintenance, take up to 50 percent less floor space

General Electric now offers steel mill drive systems for field excitation and armature supply featuring the reliability and fast response of silicon-controlled rectifiers. More than two years of successful application of SCR's by General Electric in varied industrial situations has proved their long life and high efficiency in mill conditions: SCR's are unaffected by dust, moisture, shock, or vibration. Look at these cost-cutting and profit-producing benefits:

Higher reliability—SCR's are solid-state semi-conductors with no tubes, relays, or other moving parts. SCR's have longer operating life, so downtime for maintenance is significantly cut.

Reduced floor space—up to 50 percent less than previously required for drive systems . . . space can be made available for other purposes or construction costs can be cut on new buildings.

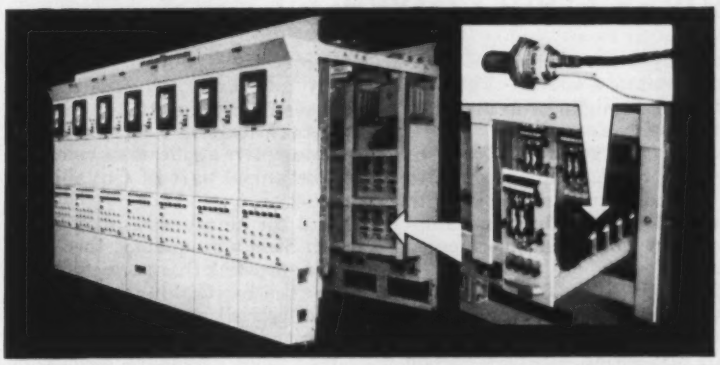
Quicker response—to signal deviation provides more accurate speed control. SCR's require no warmup before operation.

The application of silicon-controlled rectifier drives in steel mills is another example of how General Electric has served the steel industry for 75 years with products and systems to help make steelmaking faster, more efficient, and more profitable. Your General Electric sales representative is ready to assist you in planning for automation in existing facilities or in new mills . . . not only with systems using SCR's but with complete electrical systems for all process controls. Or, for additional information on SCR systems, write Section 785-16, General Electric Co., Schenectady, N. Y.

Industry Control Department, Salem, Virginia

Progress Is Our Most Important Product

GENERAL ELECTRIC



COMPACTNESS of G-E silicon-controlled rectifiers permits complete panel assembly and testing before shipment. Field installation and maintenance is facilitated because like functions can be grouped, faults quickly located.

A profile of wire forming quality is cast by clutch vibration dampener spring on contour projector in Cuyahoga Products Corp's. quality control laboratory. Function of double-torsion spring is to soak up rattles in auto clutch. It's made from Pittsburgh Steel Company's oil tempered wire.

Cuyahoga Products Corp. Gets . . .

Long Production Runs—Precision Springs From Pittsburgh Steel Wire

Controlling the dynamic forces inside a clutch takes a special degree of strength and toughness in high carbon wire springs.

Cuyahoga Products Corp. of Charlotte, N. C., helps automotive clutch manufacturers do the job with pressure-plate and vibration dampener springs made from oil tempered wire.

Pittsburgh Steel Company is one of Cuyahoga's principal suppliers of oil tempered wire—as well as hard drawn MB spring wire, low carbon bright and galvanized wires.

Cuyahoga Products ranks as the South's biggest manufacturer of springs and wire forms. Following consolidation with American Spring of Holly Inc., Holly, Mich., it's newly installed in a modern, 400-man plant in Charlotte's Arrowood industrial district.

Automotive applications count for a substantial part of Cuyahoga's production.

And for measurement of Pittsburgh Steel wire quality, there's no better yardstick than consistent performance in the long production runs of precision-formed automotive springs.

Why does Cuyahoga specify oil tempered wire for its hundreds of applications of this type? John L. Moran, Vice President—Manufacturing says it's: ". . . because oil tempered has the physical properties necessary for extremely precise forming, and for greater fatigue life under high stresses."

Cuyahoga's supervisor of inspection and quality control added:

"In our sampling program, we'll allow a supplier a small margin of deviation. Then if their wire exceeds that, we correct matters simply by switching to another source.

"Pittsburgh Steel's wire shows up very well. Offhand, I can't recall any complaints about it—either here or when we were located in Cleveland."

Clutch plate—pressure springs are just one of thousands of types of springs and wire forms Cuyahoga is called on to produce.

But they represent a typical use of Pittsburgh Steel's oil tempered wire in jobs where precision form, uniform strength and faithful performance under high stress are critical.

Surface quality, ductility and tensile strength (narrower than commercial tolerances) are vital to Cuyahoga from standpoints of trouble-free production and quality control.

Cuyahoga produces one particular size of pressure-plate spring for a big automotive clutch manufacturer from Pittsburgh Steel's .177-inch oil tempered wire.

With closed ends ground square and chamfered, the spring contains precisely 5.6 coils, including 3.46 active coils, with a free length of 1.274 inches and an .875 inch O.D.

Compressed to 1.069 inches, each of five consecutive samples must register a load of 233-253 pounds in quality control load tests made every hour on production runs, as well as at each set-up and coil change.

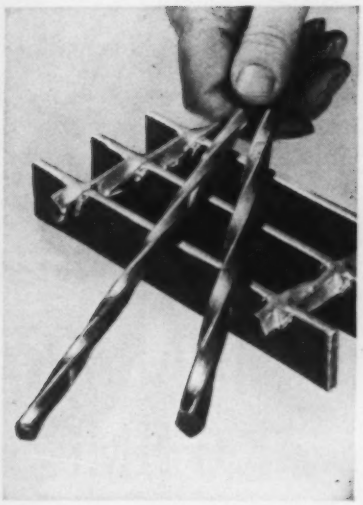
Because a friction clutch becomes a veritable beehive in operation, Cuyahoga also calls on oil tempered wire for toughness and fatigue resistance necessary to soak up clutch vibrations.

Produced on a 4-slide machine from .091 inch O.T. wire, this vibration dampener consists of a $2\frac{3}{16}$ inch double-torsion spring containing two $\frac{7}{8}$ inch O.D. turns and mounting lugs at each end.

Mounted in sets of six to provide a precise $1\frac{3}{16}$ inch gap between clutch cover and pressure plate, dampener springs serve to eliminate a major source of irritating rattles.

Investigate Pittsburgh Steel's oil tempered wire for your own spring applications where steady, reliable performance are "musts" for profitable production. Helpful service and quick delivery from ample wire stocks are part of the Pittsburgh Steel package, too. Just contact one of the district offices listed on the adjoining page.

One of 65 types of auto door lock linkage systems produced by Cuyahoga Products, lock rod above is produced on specially adapted 4-slide machine at rate of 2,000 pieces per hour from .160 bright basic galvanized wire—much of it supplied by Pittsburgh Steel Company.



Ardox, Spiralled Wire Is Designed to Save You Time and Money

Production benefits grow quickly into dollar savings when you use spiralled Ardox wire, a new product from Pittsburgh Steel Co. This preshaped wire, designed for industrial grating and ornamental iron applications, is also delivered ready for fabrication into furniture and decorative housewares.

The uniform spiralled shape is achieved at the mill. Costly, time-consuming twisting operations in your plant are eliminated. You save time, labor and equipment. Because Ardox is cold drawn into its final shape, basic metallurgical qualities remain unchanged and you get more uniform strength.

Special dies used in the cold drawing process give Ardox a fine surface finish. Spirals are more precise and uniform. Painted or plated Ardox looks better and lasts longer. A special, double spiralled patterned surface design is also available.

Made of low carbon steel, or to your own analysis, if desired, Ardox is provided in any desired straight lengths. Diameters to your specifications.

Precise forming, long service under tough conditions are required of clutch plate pressure springs. Made by Cuyahoga from Pittsburgh Steel's .177 oil tempered wire, springs above are being ground square and chamfered.

Fatigue life, toughness of Pittsburgh Steel oil tempered wire are ideal for the job this clutch anti-rattle spring must perform.

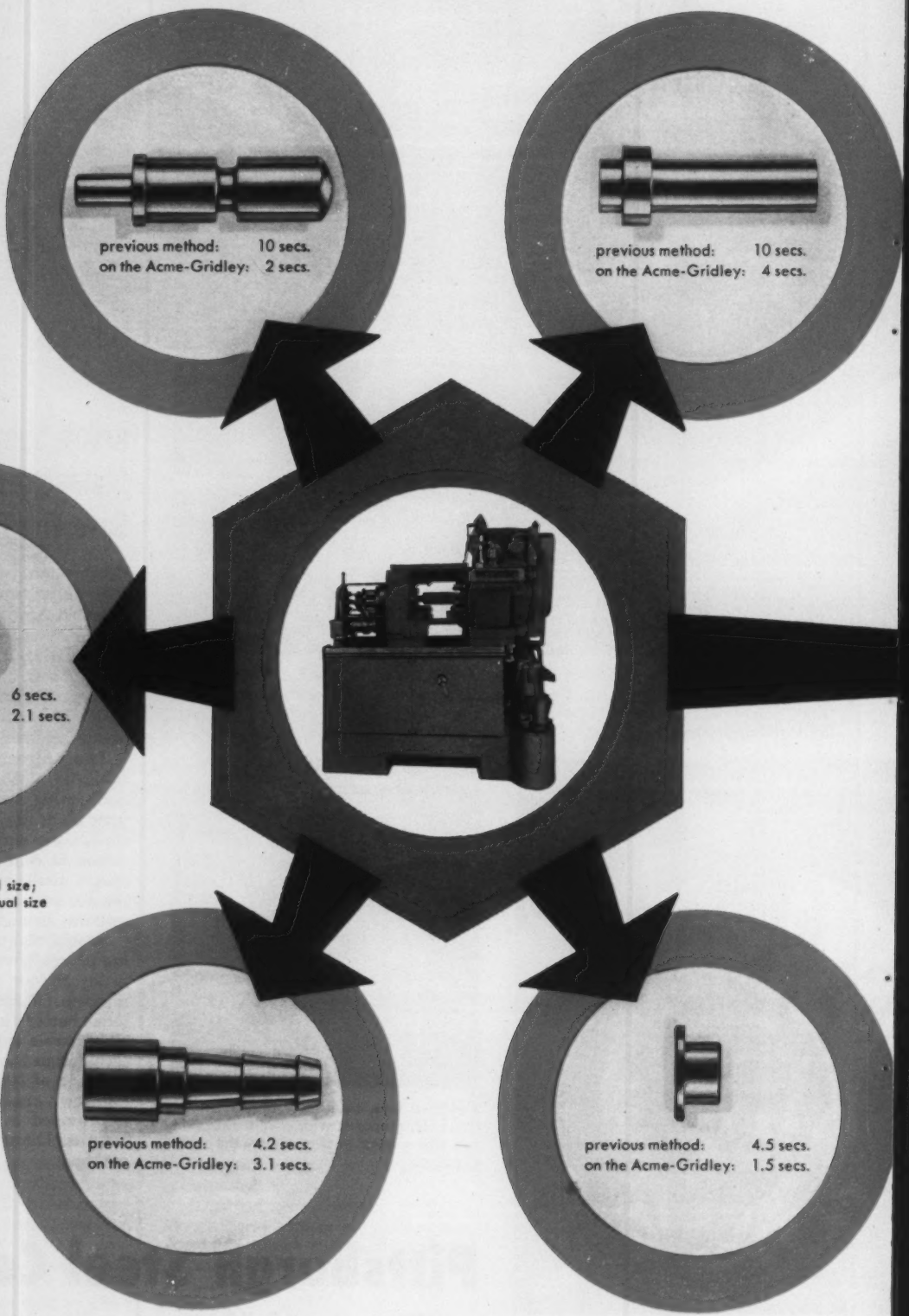
Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

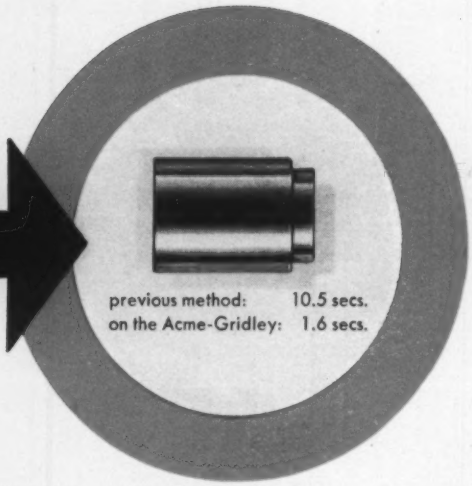
DISTRICT SALES OFFICES

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

Steel


previous method: 10 secs.
on the Acme-Gridley: 2 secs.
previous method: 10 secs.
on the Acme-Gridley: 4 secs.
previous method: 6 secs.
on the Acme-Gridley: 2.1 secs.
This part 2 times actual size;
all others 1½ times actual size
previous method: 4.2 secs.
on the Acme-Gridley: 3.1 secs.
previous method: 4.5 secs.
on the Acme-Gridley: 1.5 secs.

ACME-GRIDLEYS SLASH AVERAGE MACHINE TIME 68%...

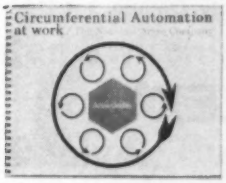


Pay off in profitable new business for screw machine job shop...

Before installing three Acme-Gridley 7/16" RA-6 Spindle Automatics, Carleton Screw Products Co. of Minneapolis found it difficult to keep pace with the demand for greater precision and quality required by current manufacturing standards. Consequently, high costs resulting from slow production methods made Carleton less competitive on short run, small part jobs.

With Acme-Gridleys, it's a different story. Short run, small part jobs are Carleton's bread and butter. The Acme-Gridleys cut average machine time 68% and always produce precision parts that surpass customer specs . . . giving a big boost to Carleton's "repeat order" business.

The 7/16" was *designed* for top economy in the mass production of miniature and sub-miniature parts. It's compact, rugged and has the versatility to handle an amazing variety of jobs. In your shop . . . for years to come . . . it will pay off in lower costs and higher earnings.



The number of *different* jobs that can be set up on any Acme-Gridley amazes everyone. To give you some idea, we've described some 57 actual jobs in a new 64 page bulletin called "Circumferential Automation at Work". For your free copy, call, write or wire.

National Acme

The National Acme Company
189 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

DURAFLEX

the more durable, ductile, flexible phosphor bronze—at no extra cost

Here is one of the most versatile of phosphor bronzes. The superfine-grain structure of Duraflex provides a considerable improvement in fatigue life over regular phosphor bronze. Now you can obtain higher endurance limits with greater formability. It's ductile. It's resilient. It's corrosion-resistant!

This new, higher quality Anaconda phosphor bronze is now available in several standard phosphor bronze alloys—in strip metal up to 0.062″ thick and up to 14″ wide in all standard tempers, and in wire up to 3/16″ diameter. Duraflex strip is also available in long rolls.

Within the capabilities of size and alloy composition, Duraflex strip and wire can be applied to the innumerable uses for which conventional phosphor bronzes are employed, and in most instances provide longer and more efficient service. *Yet Duraflex sells for the same price as regular phosphor bronze in the same alloys and forms.*

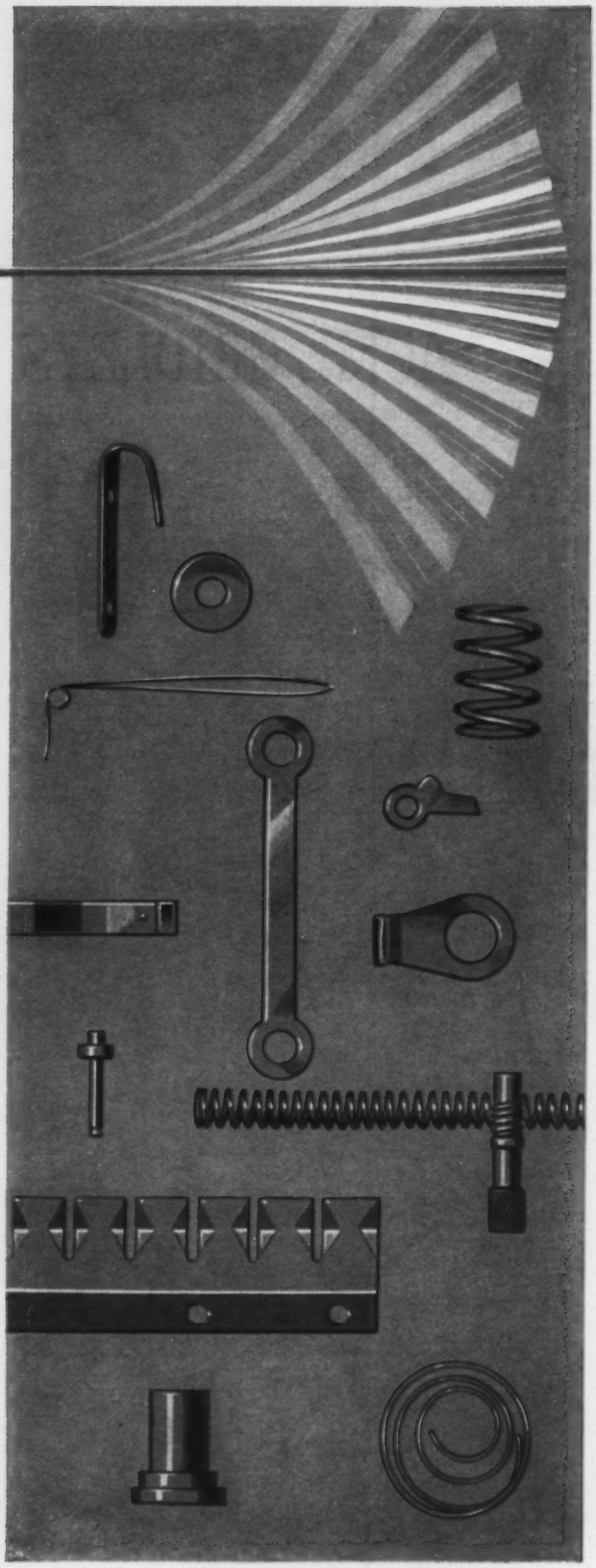
Publication B-38 tells the story. Write for your copy—or for any assistance from our Metallurgical Dept. in selecting the proper alloys for your metalworking projects. Address: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 61-1148

DURAFLEX®

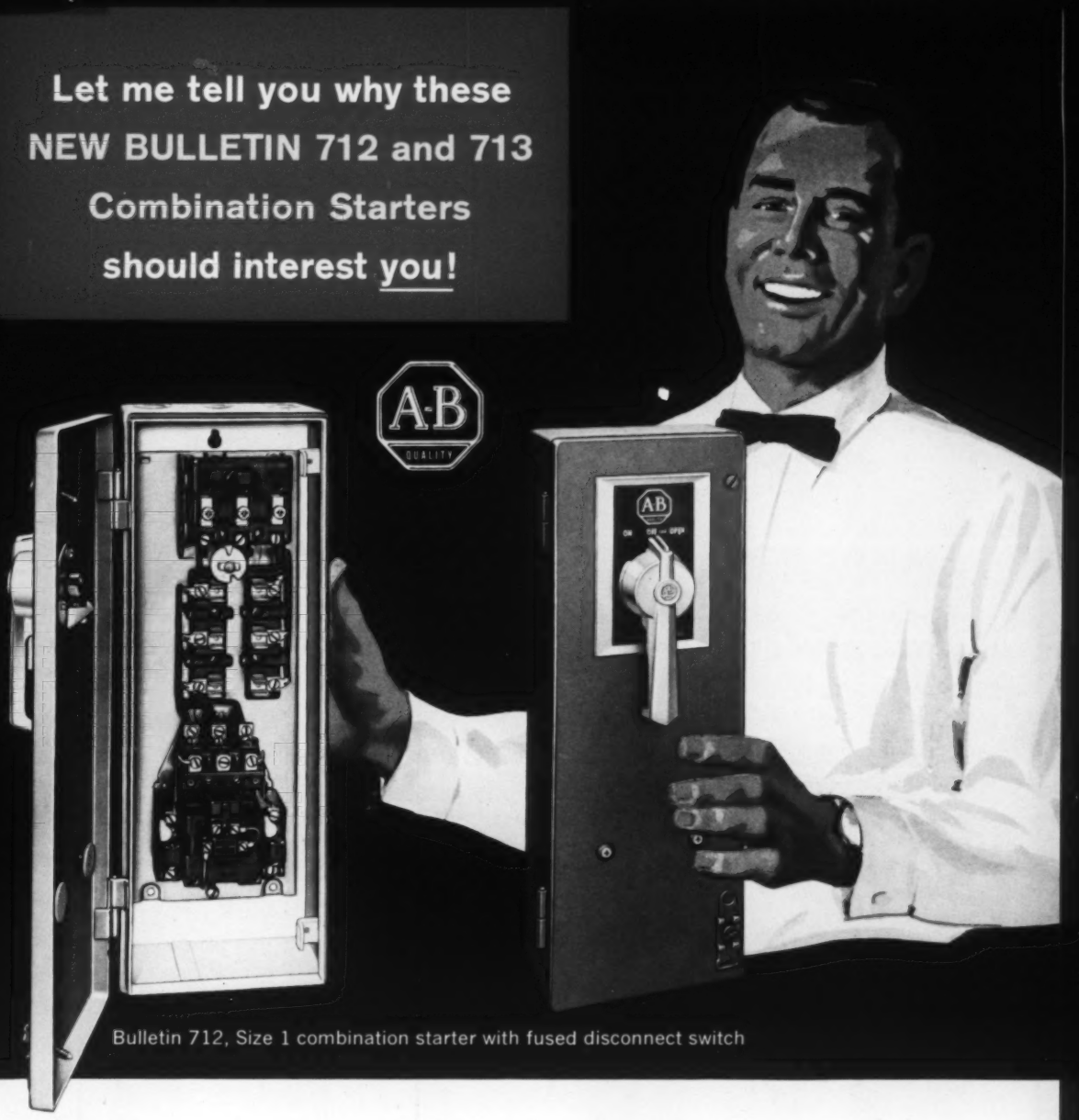
A product of

ANACONDA®

AMERICAN BRASS COMPANY



Let me tell you why these NEW BULLETIN 712 and 713 Combination Starters should interest you!



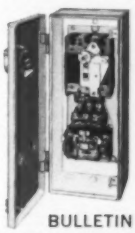
Bulletin 712, Size 1 combination starter with fused disconnect switch

They have — Smaller Size...Greater Switching Capacity... Greater Reliability...Longer Life...Complete Safety... Generous Wiring Room...Simple Design...Businesslike Beauty

Rating for rating, the new Bulletin 712 motor starter will outperform and outlast all others. Complete safety for the operator is assured because the cabinet door cannot be opened until the lever is moved to the OPEN position, which opens the visible contact disconnect switch.

The Bulletin 713 combination starter provides similar features for complete safety, but uses an ITE circuit breaker as a method of disconnecting.

Brooks Stevens, famous industrial designer, has given the entire line of enclosures, an undeniable "eye appeal"—an asset to any modern machine tool or industrial installation. Please write for details, in Publication 6100: Allen-Bradley Co., 1316 S. Second Street, Milwaukee 4, Wis.



BULLETIN 713
Combination Starter with Circuit Breaker in Nema Type 1 Enclosure.

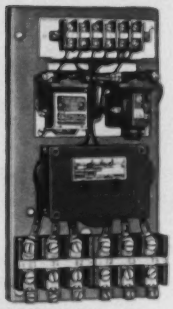
16-61-MR

ALLEN-BRADLEY

Member of NEMA

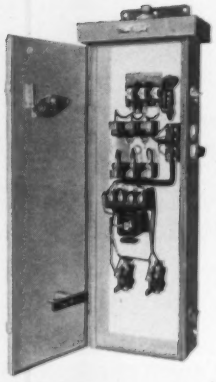
QUALITY MOTOR CONTROL

Your A-B Handy Catalog Lists These Control Devices Often Considered "Special"



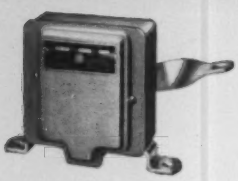
BULLETIN 812
Phase Failure—Phase Reversal Relays

Style F relay (above) protects against all open phase conditions on a branch motor circuit. Style R disconnects the motor upon a phase reversal. Style RF gives phase failure and phase reversal protection.



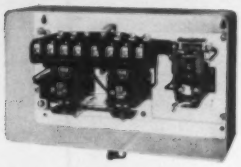
BULLETIN 1232
Pump Control Panels

Complete units for automatic operation of irrigation and oil well pumps. Employ standard A-B Bulletin 709 magnetic starter with manual disconnect switch or circuit breaker in weatherproof enclosure. Wide variety of optional features available.



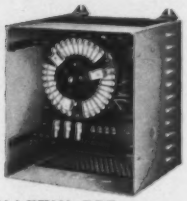
BULLETIN 840
Float Switches

These quality switches are available in a wide range of types for automatic control of motors operating tank or sump pumps. The snap-action switch mechanism assures positive operation, no matter how slowly the liquid level changes.



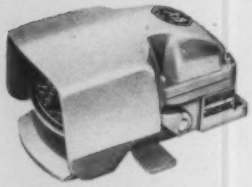
BULLETIN 1270
Automatic Transfer Switches

These switches are designed to transfer power-load to standby supply when normal power fails or drops too low. Automatically returns load to normal supply when power is resumed. Mechanically interlocked.



BULLETIN 555
Speed Regulators

Provide manual speed control of wound rotor motors for either fan or machine duty. When used with magnetic starter, the first step closes control circuit.

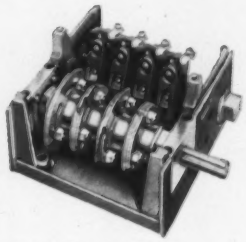


BULLETIN 805
Foot Switches

Ruggedly built to withstand the most severe industrial usage. Snap-action switch mechanism features maintenance free silver contacts. The foot switch shown above assures complete "safety" for the operator. Also made without top guard.

BULLETIN 836
Pressure Controls

For machine tool hydraulic systems operating at pressures up to 5000 psi. Oiltight enclosure. Operating pressure and differential are adjustable. A visible indicator shows trip point. Maintenance free silver contacts.



BULLETIN 803
Rotating Cam Limit Switches

Heavy-duty controls for use on automatic production machines. Made with up to 12 independent circuits which can be separately adjusted for operation at any point of rotation.

BULLETIN 365
Multi-Speed Drum Switches

Designed for manual starting, speed changing, and reversing of polyphase multi-speed motors. Made for up to four speeds either non-reversing or reversing.

ALLEN-BRADLEY

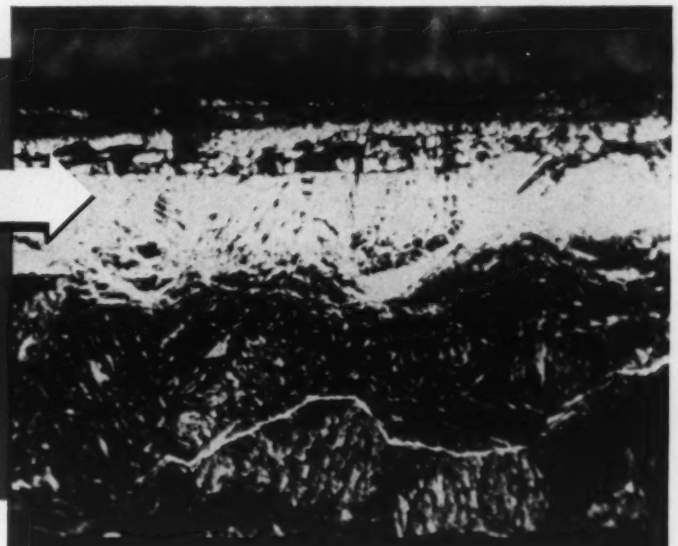
Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

QUALITY MOTOR CONTROL

10-61-AB

REMOVE white layer FROM NITRIDED PARTS without grinding



WHITE LAYER ON NITRIDED STEEL PART — 500X

No longer is it necessary to grind the white layer off nitrided parts — gears, bearings, etc.

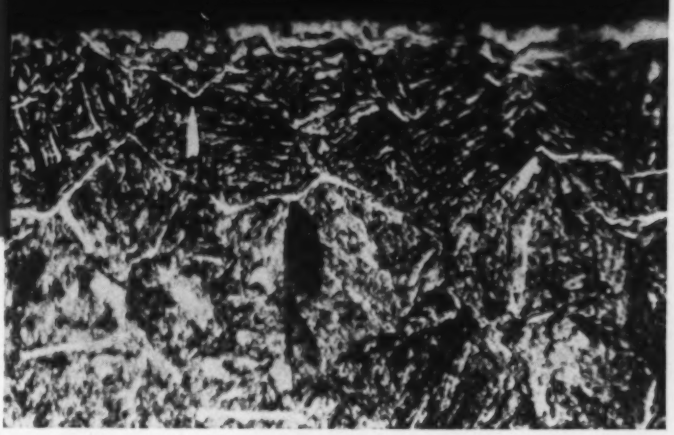
Now you can get rid of this blemish much more economically and without jeopardizing critical surfaces by grinding.

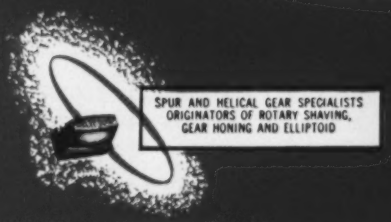
Your answer is BAN-WITE, a new metallurgical process (Pat. 2,960,421) developed by Red Ring Research.

This not only removes the objectionable white layer but it also tends to deepen the nitrided case. The danger of grinding checks is completely avoided.

Send your nitrided parts to us for treatment or, if you prefer, we will license you to use the process in your own plant. Either way, you save money and avoid rejects. Contact our local representative to get your jobs started now.

SAME PART AFTER BAN-WITE TREATMENT — 500X



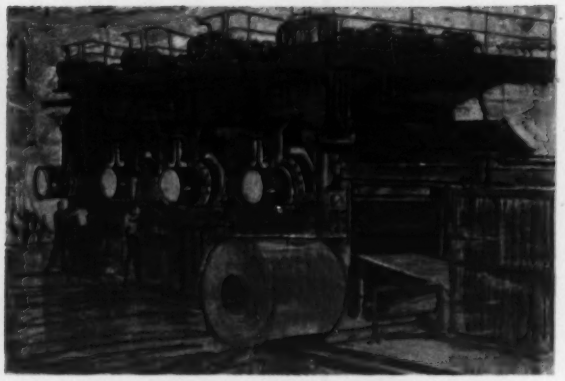


WORLD'S LARGEST PRODUCER OF
GEAR SHAVING AND HONING EQUIPMENT

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

GENERAL ELECTRIC AUTOMATION SYSTEMS provide scientific production control. Computerized order editing, production scheduling, material ordering, and dispatching are automatically integrated with production processes.



GENERAL ELECTRIC AUTOMATION SYSTEMS automatically control strip gage in tandem, single-stand, and reversing cold mills. New for tandem cold mills is automatic threading and set-up to reduce operating time and scrap losses.

Leadership in Industrial Automation

General Electric Is the One Source for Automation of

Advanced automation technology is one good reason why General Electric is your best source for complete automation, but it's not the only reason:

No other single manufacturer provides such a complete array of superior electrical system components. In fact, you can get from this single source—General Electric—every component *and* the system-engineering know-how to assure that your management decisions have a more immediate and profitable effect on product, costs, and mill utilization.

Long and close association with your industry has provided General Electric with unequalled experience in the design and manufacture of basic electrical systems for almost every metal-producing process. This relationship has also provided General Electric with a full knowledge and appreciation of your industry's processes, problems, and goals.

Industry's needs pace General Electric's progress—progress which has produced such firsts as: amplidyne-regulated power systems for reversing hot mills, automatic gage control for cold and hot strip mills, punched-card programmed reversing hot mills, "Top-Forward" main drives, and computer-controlled hot strip mills. Now, continuing progress is providing completely-automated production systems for virtually every metal-producing process. *And General Electric can link these processes into an over-all system of integrated automation for centralized control of your whole business.*

GENERAL ELECTRIC AUTOMATION SYSTEMS reduce mill equipment abuse. In reversing hot, hot strip, billet, structural, and bar mills, rolling dimensions are consistently held within desired tolerances.

GENERAL ELECTRIC AUTOMATION SYSTEMS protect high value of your product during shearing and classifying, side trim, and recoil line operations. Automatic inspection increases classifying speed and utilization of end product.

Your Entire Plant

For full details on General Electric's plan for complete automation, contact your nearest G-E Sales Engineer. He is ready to bring the unequalled system-engineering experience and product diversification found *only* at General Electric to bear on your automation needs. Meanwhile, if you'd like a complete set of these paintings, in color and suitable for framing, just write over your company letterhead to General Electric Company, Section 659-06, Schenectady 5, New York.

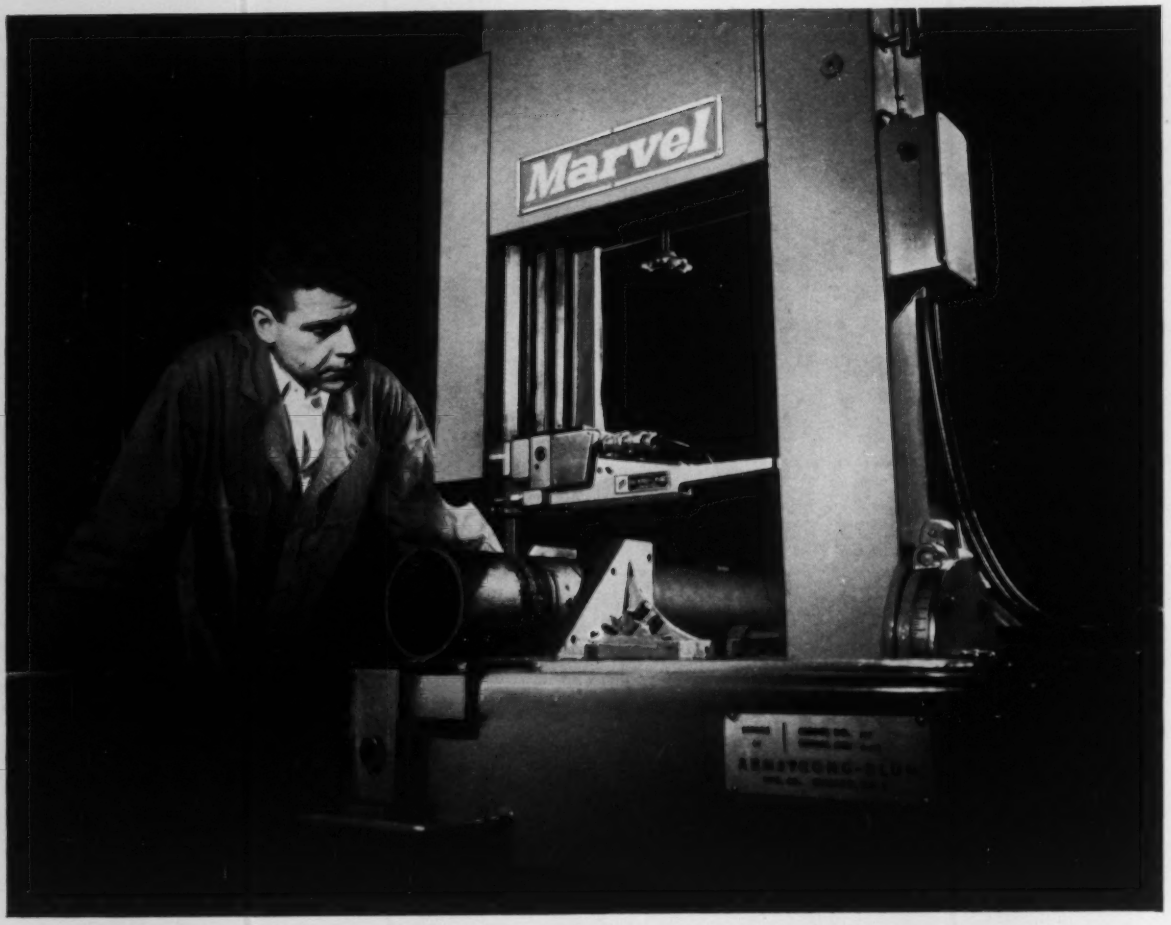
Progress Is Our Most Important Product

GENERAL ELECTRIC

GENERAL ELECTRIC AUTOMATION SYSTEMS provide maximum product consistency. Computer control and automatic sensing applied to blast furnaces, oxygen converters, sinter plants, and open hearths increase yield from given input.

GENERAL ELECTRIC AUTOMATION SYSTEMS provide discreet handling of materials in process. Automatic control of cranes, conveyors, stacking equipment and ore unloaders means precise, safe, timely handling.

GENERAL ELECTRIC AUTOMATION SYSTEMS provide more continuous operation for annealing, tinning, galvanizing, and pickling lines. Computer control assures proper conditioning of strip to customer specifications.



He's Watching a Band Sawing Miracle

This band saw operator at the Bell & Gossett Company plant in Morton Grove, Illinois, is watching "Controlled Accuracy" . . . accuracy, being held to within a few thousandths of being perfectly straight, and he can actually *see* the band blade being guided in the saw cut to produce this accuracy! No further machining is required before the pipe is welded into an assembly for a Bell & Gossett Heat Exchanger Unit.

Band sawing accuracy like this is nothing short of miraculous—especially when it can be done on a high production basis, as Bell & Gossett is doing. And when the same tolerances can be held on cut-off pieces from 2″ to 18″ in diameter, this MARVEL #81 Band Saw Machine can be truly called a precision machine tool.

The secret of this amazing sawing accuracy is in the MARVEL "SURE-LINE" Automatic Accuracy Control—a simple and extremely effective electro-mechanical servo-mechanism that continuously senses and automatically corrects any tendency of a band blade to drift to either side of a desired line of cut. The "SURE-LINE" unit literally "steers" the blade to make a straight cut. This permits the use of heavier feed pressures and, when desirable, higher blade speeds, to do the work faster, without sacrifice of accuracy. Incorporated in the new MARVEL #81 Series High Speed Heavy Duty Hydraulic Band Saws, the "SURE-LINE" permits full utilization of all the advantages of high speed steel band saw blades—while extending their usable blade life as much as 50%.

Before you buy any band saw machine, get complete details on MARVEL #81 Series Single Cut, or Automatic Shuttle Type Bar Feed Production Band Saws—the machines DESIGNED AND BUILT TO REDUCE SAWING COSTS. *Write for catalog today.*

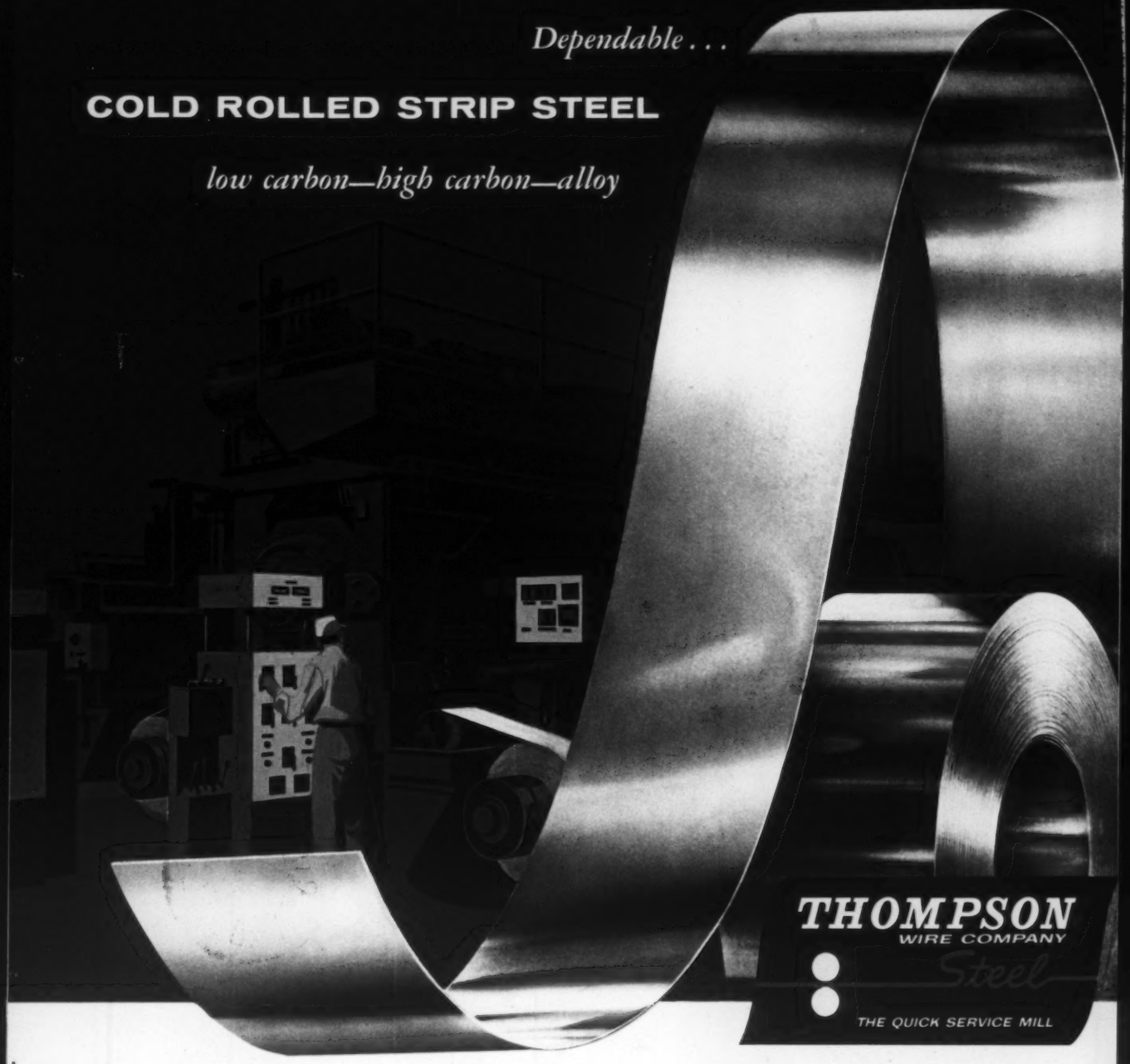
ARMSTRONG-BLUM MANUFACTURING CO.
5700 West Bloomingdale Avenue • Chicago 39, Illinois

MARVEL *Metal Cutting* SAWS
Better Machines-Better Blades

Dependable . . .

COLD ROLLED STRIP STEEL

low carbon—high carbon—alloy



MILLS STRATEGICALLY LOCATED TO SERVE YOU

Dependable Cold Rolled Strip Steel products can be quickly shipped to you from one of FOUR STRATEGICALLY LOCATED MILLS—Boston, Baltimore, Detroit, Chicago.

Widths from 18″ to narrower than a shoe string. Thicknesses from $\frac{1}{8}$″ to less than paper thin.

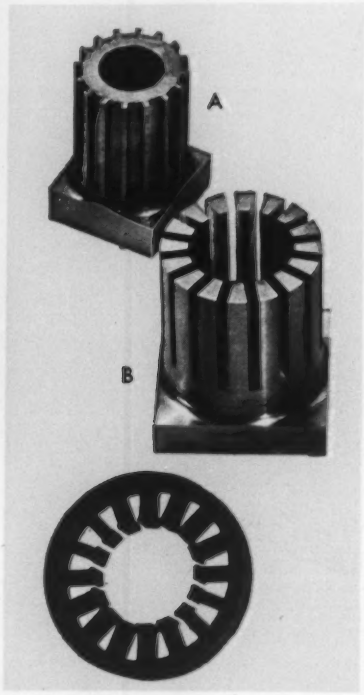
Low carbon steel with brite plating finish in all tempers—annealed or hard rolled intermediate and high carbon steel—tempered spring steel.

Write or 'phone today—we know you will agree—*there is a helpful difference in Thompson steel and in Thompson service.*

THOMPSON
WIRE COMPANY

Cold Rolled Strip Steel Mills
CHICAGO, ILLINOIS • BOSTON, MASS.
DETROIT, MICH. • BALTIMORE, MD.
WORCESTER, MASS. • Specialty Wires

On this Sheffield-Cavitron® Ultrasonic Machine Tool is shown the set-up for machining a motor laminator of ferrite — a material with the hardness of sapphire and the machinability of glass. Illustrated separately are a finished laminator and the two cutting tools involved. The smaller tool (A) first machines the small slots around the center of the ⅛" hole in the laminator to a tolerance of ±.001". The larger tool (B) then machines the 16 wedge-shape slots simultaneously, concentric with O.D. and I.D. within .002" T.I.R. "Working" this complex ferrite shape is typical of the capability of Sheffield Ultrasonic machine tools and NORBIDE boron carbide abrasive in broadening the machinability of modern materials.



Now it's easy–

with ultrasonic machining

...using NORBIDE* boron carbide

Yesterday, materials like ceramics, refractories and various new alloys were regarded as too hard or too brittle for conventional machining. Today, precision-machining these and many other materials is routine with ultrasonic machine tools.

Equally routine in this rapidly expanding field of machining is the use of NORBIDE boron carbide. Recommended by Sheffield and other machine tool builders, this Norton-developed abrasive has proved itself the ideal cutting agent.

Driven by a vibrating ultrasonic force, far beyond the range of the human ear, NORBIDE grit hits the work with an impact of 150,000 times the grain's own weight — *without fracturing*. Second only to diamonds in hardness and recognized as much more effective than silicon carbide grain, the Norton achievement is so free from impurities that every ounce delivers high-precision, trouble-free cutting action with maximum power and longest life.

Get more facts from your Norton Man on this tremendous advancement in modern machining. Find out how it can help you improve and economize your own production. See your Norton Distributor or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

NORTON
BORON CARBIDE

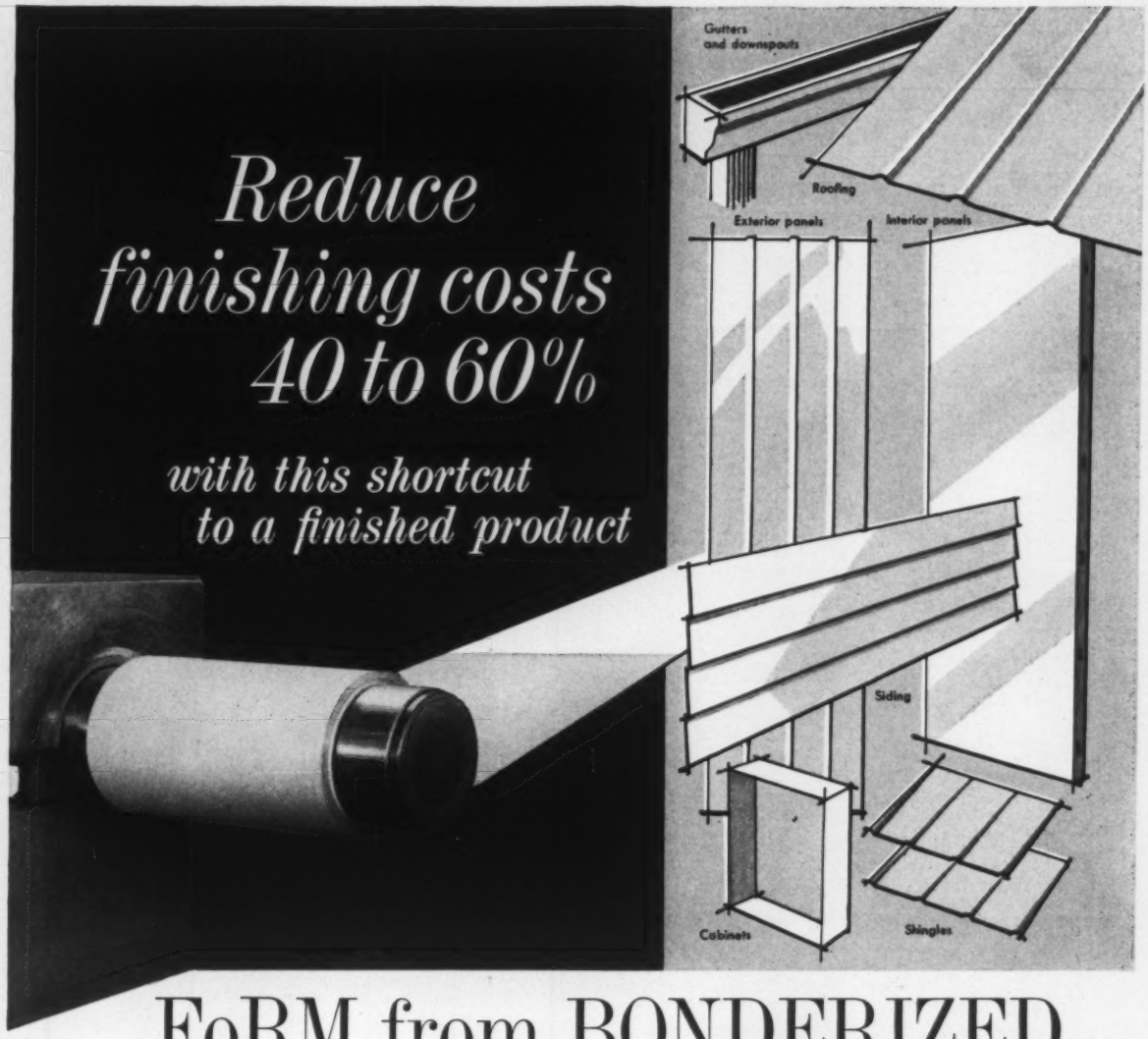
G-417

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Reduce finishing costs 40 to 60%

with this shortcut to a finished product



FoRM from BONDERIZED painted coil stock

Actual field experience and careful cost projections by manufacturers indicate that finishing costs can be cut 40 to 60% by using pre-painted coil stock. This is true for products formed from steel, aluminum or galvanized, using baked-on, high quality paints over Bonderite.

These spectacular savings result from decreased paint consumption and application costs per thousand square feet of surface.

Manufacturers of many types of products are taking advantage of these savings by using Bonderized, painted coil stock for their production now. Coil stock may be treated and painted in the plant, or purchased already Bonderized and painted, ready for forming and fabrication.

The Parker technical representative near you has full information on this revolutionary new way to reduce finishing costs. Or use coupon below.

PROTECTED BY Bonderite PARKER RUST PROOF CO. QUALITY CORROSION RESISTANT

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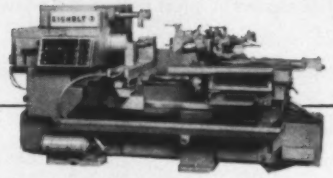

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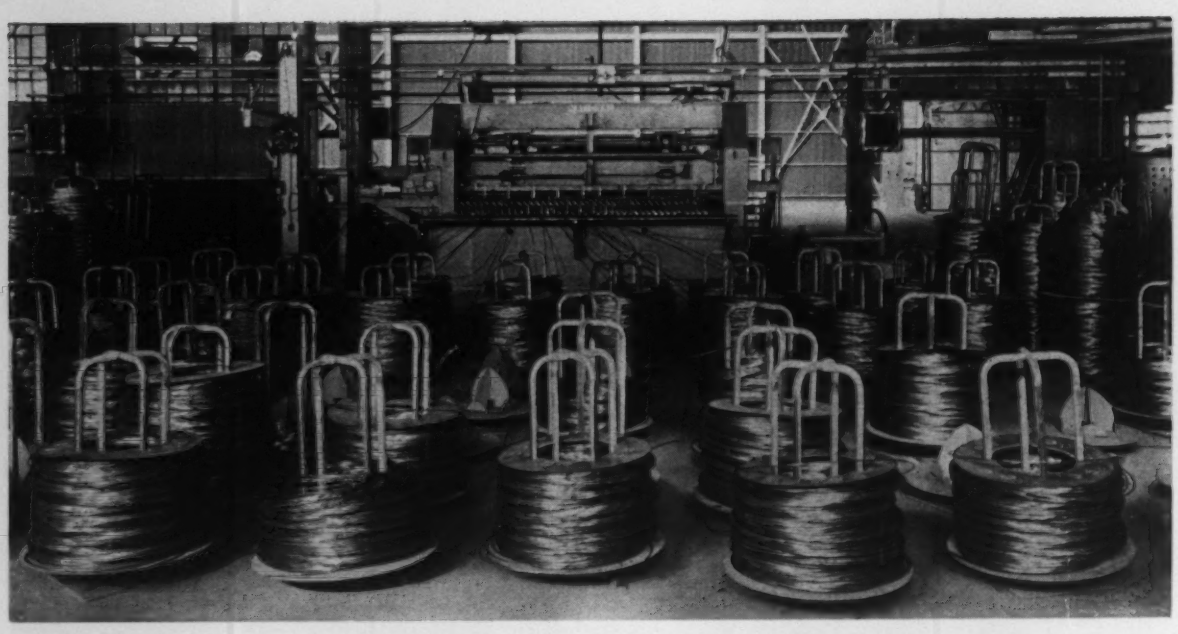

Stop avoidable coil-changes with DSC LPR® COILS and you stop fabrication downtime, needless scrap, and other production losses

We Make and Take Our Own LPR Medicine

At DSC we manufacture just one end-product, namely, welded wire fabric for concrete reinforcement. Naturally, the material used is Portsmouth produced Brite Wire in LPR coils.

Pictured above is one section of our Portsmouth Division Fabric Department. It takes up to eighty 3,000 pound LPR's, all running together, to feed that mammoth weaver and welder in the background. . . . And to think that in the beginning we used 300 pound traditional mill bundles!

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What we say about the cost-saving advantages of LPR's reflects not only our own experiences, but also the experiences reported by our LPR customers. For example:

- Downtime frequency due to coil changes and set-up adjustments reduced as much as 95%
- Unloading time alone cut as much as 82%
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- Man-hour costs trimmed 20% and more
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- Inventory management greatly improved
- Returnable-carrier problem and small coil racks eliminated

These extra benefits are yours without extra cost.

Learn what LPR's can do for your Brite Wire operations. Call your nearest DSC customer "Rep" for the facts, or write Detroit Steel Corporation, Box 7508, Detroit 9, Mich.

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Why Is Steel Big?

Many years ago we stood on the deck of an ore freighter in Duluth, looking up through the twilight at the towering loading chutes. We watched 18,000 tons of red ore cascade into our holds in less than two hours. The physical facilities were awe-inspiring.

It was there we became convinced that integrated steel companies must be big. Otherwise, they could not afford the facilities they need to be efficient and to provide quality steel at reasonable prices.

The thought was prompted because at the time some politician, whose name is forgotten, was proposing to break the steel industry into bits and pieces, much as Senator Gore of Tennessee now threatens.

The requirements for making steel from raw materials to finished products are huge. The job calls for big organization and big money. Small or medium sized companies couldn't do it efficiently.

Marshaling the necessary raw materials—four tons for each ton of finished steel—is in itself a tremendously expensive undertaking. Developing new ore fields, in the U. S. or outside our borders, requires the investment of hundreds of millions. In many cases, several large companies join in such undertakings to share the cost. Railroads must be built. River channels have to be deepened. Special vessels are constructed to haul out the ore. Beneficiation plants may be required at the mine site.

Such expenditures start years before any benefits are realized. The companies make the gigantic investment to assure a continuing flow of metallics.

If we cooked steel today in 25 or 40 ton open hearths, instead of 400 ton and larger units, steel prices would have to be much higher.

If we rolled steel on other than large continuous mills, we probably couldn't afford it.

And if you operate batteries of 400 ton open hearths or large continuous mills, you're big.

Steel mill economists tell us that an integrated mill with less than a million tons of capacity would not be economical to build today. Some believe two million tons is the minimum.

We are talking in terms of $350 million to $700 million in plant, not including raw materials developments or outside-the-plant transportation facilities. That's what is needed for efficiency, and it is hardly small business.

While it may be politically popular to attack big business, we believe arguments like those of Senator Gore are absurd and, perhaps, dangerous.

In steel, efficiency comes from integration—not fragmentation.

Walter J. Campbell

EDITOR

Reliance develops first line of solid state regulators for variable speed drives

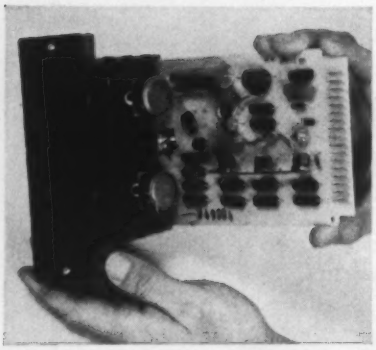
. . . gives you better circuits, precise control, less maintenance.

Reliance has produced the first complete line of solid state regulators and exciters for variable speed (V*S) drives and Engineered Drive Systems. These new devices, using power silicon rectifiers and diodes in place of tubes, achieve precise motor control, 1/10% regulation at base speed, with response times up to twice as fast as tube-type regulators. Here is a major advance in variable speed control, and a major advantage for the industrial user. Reliance Drives with these new regulators are now available to you in 1 to 1500 horsepower.

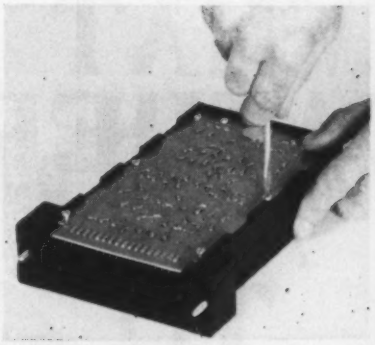
Reliance research and development brings you a more efficient drive than ever before . . . and a notable refinement of already well-engineered systems.

The pictures on the facing page tell the story.

RELIANCE . . . builders of the tools of automation

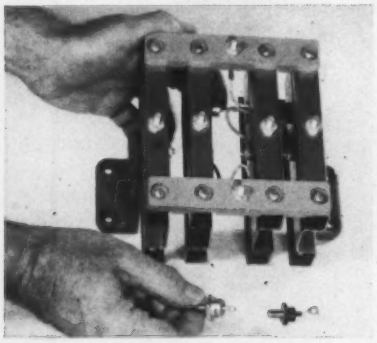


1. Heart of the system is new "Cardpak" control circuit, with transistors, capacitors and resistors to amplify feed-back signals.

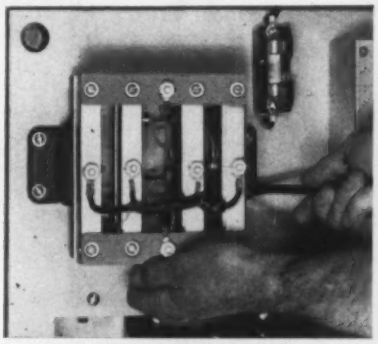


2. Each plug-in "Cardpak" module is a complete control circuit...can be quickly checked and easily replaced, if ever necessary.

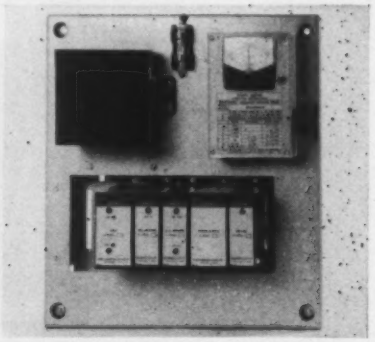
3. Each V★S Drive control system is tailored to your specific job . . . with "Cardpak "circuits pre-engineered for reliability, fast delivery.



4. Power silicon controlled rectifiers and diodes, instead of tubes, are among the most reliable components yet devised.



5. The rectifiers, mounted on copper plates for heat radiation, operate over a wide temperature range with no special cooling.

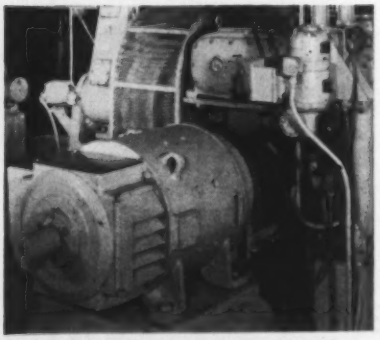


6. Complete panel can be checked quickly for start-up and trouble shooting with the optional test fixture . . . one meter, one knob.

7. Motor control is precise . . . 1/10% regulation at base speed, with response times up to twice as fast as tube type regulators.

8. The Reliance V★S Drive control cabinet is 35% smaller than conventional drives. Cabinet can be located where convenient.

9. Operator's station centralizes drive operation. Multiple stations, bench boards, pendent stations and special controls available.



10. The Super-T D-c. Motor . . . integral part of the V★S Drive. It's rugged . . . absorbs repeated 100% overloads for one full minute.

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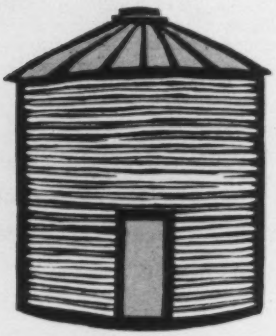

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INLAND

Metalworking Gains Forecast for '62

CONFIDENCE with a touch of conservatism prevailed at the annual forecast meeting of the Cleveland chapter of the American Marketing Association last week. While everyone thought that 1962 would be a banner year, there was a lack of optimism characteristic of Soaring Sixties sessions of two years ago.

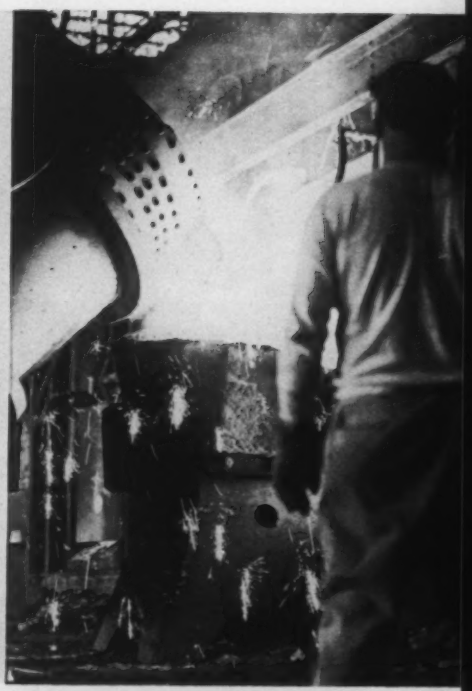
• **Soft Sell**—Setting the pace for the industry specialists on the program, Merle Hostetler, vice president, Federal Reserve Bank of Cleveland, told the marketers that he sees a moderate rise of 3 to 5 per cent in the FRB's index of total industrial production next year. Compared with this year's average of 110 or 111 (1957=100), that would mean between 113 and 116 in 1962, below many estimates to date. "This is in line with something well under a gross national product of $600 billion by the end of the year being pushed by some economists," he feels. "If it should get that high, it implies at least 3 per cent inflation."

He does not see a year devoid of inflation even though price indexes currently appear stable. "We can hope for price stability. But the only thing wrong with hoping is that it's too ideal for this type of recovery."

• **Steel Problems Coming**—Despite the outlook for a near record year in 1962, the steel industry has some serious problems to face, in the opinion of William P. Carlin, director of economics, Republic Steel Corp. "The second quarter is the biggest question mark. There will be a gradual buildup in both consumption and production of steel through the first quarter as a natural result of a rising economy. Then the consumers are likely to recall the 1959 situation and start putting quite a bit on the shelf." Consumers

STEEL

Ingot production of 110 million to 115 million tons expected. Output higher in first half as users hedge against possible strike. Some inventory liquidation in second half.



AUTOS

Conditions right for dramatic surge to 7 million sales (units) rate in fourth quarter, followed by 6.8 million sales pace next year.

probably will have a three month supply of steel on hand by mid-year. Then there will be a shakeout, which will cut production in the third quarter.

More serious will be the profit squeeze in steel. "The unions are talking about a 10.5 cent an hour wage increase on Oct. 1, but experience has shown the industry that it will end up costing about 13 or 14 cents an hour. The difference comes when you start figuring all the fringes on a higher base wage.

There are many outside pressures rising to hold the price line, but Mr. Carlin affirms the industry's position that the market place will determine the final decision.

MAJOR APPLIANCES

Look for sales to hit 16.8 million units, up 5 per cent from 1961. The industry's outlays for plant, equipment will decline.

• **Autos to Roll**—With the strong finish predicted for the fourth quarter, Robert J. Eggert, marketing research manager, Ford Div., Ford Motor Co., sees 1961 new car sales close to 5.9 million units, down from 1960's 6.6 million mark. "The leading economic indicators are pointing strongly to a good year in 1962, which should mean a good automotive year. In addition, stocks of new and used cars are about 300,000 units lower than they were a year ago, and used car prices are the highest they have been in several years.

"The consumers' credit position is favorable, and the trend toward two and even three car families is gaining. At this time, 7 million units should be viewed as the maximum level of car sales in 1962."

• **Appliances Picking Up** — The trend line for the last several years indicates sales of major appliances could reach 17.8 million units in 1962, says Harry E. Weimer, director, Market Research Dept., Whirlpool Corp. "But this is too optimistic in our opinion. Sales this year will drop about 1 per cent under the 1960 level, but the trend in the last half is turning up nicely." Retail price cutting has gone about as far as it can, so there is not likely to be any across the board slashes in 1962 as there were in prior years.

Prices generally may even edge up slightly, he asserts.

CONSTRUCTION

A record $60 billion is predicted. Housing starts will increase 75,000 to 100,000 units above 1961 level. Long range projection: Total construction will top $100 billion by 1975.

• **Construction Still Climbing** — "With one exception—public hospitals—every single type of publicly financed construction is poised for a gain in 1961 over 1960, and the same goes for 1962 over 1961," declares Benjamin D. Kaplan, director, Construction Industry Div., Business & Defense Services Administration, Department of Commerce. Of the anticipated $60 billion total for next year, he sees private outlays accounting for more than $41 billion and public outlays more than $18 billion.

Auto Bargaining Focuses On Ford, Chrysler Pacts

WALTER REUTHER has turned his attention to Ford and Chrysler. The companies are expected to adopt the 12 cent economic package GM accepted. As STEEL went to press, local bargaining units showed little inclination to settle peacefully. Both companies are operating under contract extensions that can be terminated on 48 hours' notice.

Labor observers in Detroit have wondered why Mr. Reuther hasn't clamped down on recalcitrant locals as he has in the past. The best answer seems to be that he's letting the locals blow off steam so they won't hold grudges against tighter work rules and broader bumping provisions. They were exchanged for long term security benefits that are less obvious to the man on the assembly line.

• **Output to Date**—The "local" approach is also an effective way of disproving 1958 contract post mortems—it was said that the UAW was growing weaker and lacked bargaining punch. By staggering the walkouts, each company is put under increasing pressure to settle quickly so it won't lose out in the 1962 production race. As the picture shapes up today (Sept. 25) GM has built 144,000 new models and is getting back into production. Ford has turned out 150,000 units, and Chrysler has produced about 65,000 vehicles, but both firms face possible shutdowns. American Motors Corp., which initiated the economic pattern, never was struck. Its 1962 model output totals 20,000.

Late last week 54 of the 85 bargaining units in Ford plants still had unsolved demands on the table. Important issues included seniority, overtime, and wage classifications.

• **Ford's Problem** — Unlike GM, Ford spelled out its 24 minutes of relief time in the 1949 contract, so it isn't expected to be a stumbling block except at a few plants like the St. Louis assembly facility where management is trying to get workers to meet present production standards. The St. Louis plant looks to be the sorest spot in Ford's lineup. It has been on strike since July 26, and company people say a settlement seems no closer than it was when the workers first walked out.

But, the St. Louis problem is not as vital from a company standpoint as those at some other plants. Reason: St. Louis is an assembly plant. Ford officials are more concerned, for example, over plants like the Indianapolis facility which makes steering gears—a walkout there could hamper all operations.

• **Chrysler's Picture**—Only a few of the company's 45 locals are ready to settle. Key issues are work rules and production standards. Detroit plants like Dodge Main and the Nine Mile Press Plant are expected to hold out tenaciously. The stamping facility has already had several wildcats in protest of a city-wide bumping agreement for Chrysler's UAW members. The company filed a $100,000 damage suit against the union local after the last walkout Sept. 10 to 12.

Norman Matthews, UAW vice president who oversees the Chrysler bargaining group, still seems determined that the company will win no "poverty concessions." He contends that workers shouldn't have to pay for what he has termed "mistakes of irresponsible management." One possibility: If Chrysler accepts the 12 cent economic package, the International may force the locals into line, so Chrysler can continue production without widespread interruptions.

White Motor Co. signed its three year labor pact with UAW Local 32 last week. J. E. Adams, executive vice president, said the contract followed the pattern of GM's.

New Hot Mill Increases Sheet Output

A NEW, 56 in., hot strip mill at the Warren (Ohio) Works of Republic Steel Corp. can roll 140,000 tons of steel sheets a month with its current complement of slab heating furnaces. (Output from an older, 42 in. mill, which has been dismantled, was 85,000 tons a month.) The new facility, which cost $55 million, will turn out carbon steel sheets and do most of the company's hot rolling of stainless steel. It will be used to roll low alloy steels, special grades of stainless for aircraft and missile uses, and silicon steel sheets for electrical applications.

MEMO TO MIDDLE MANAGERS:

How to Become President

D. A. RHOADES, president
Kaiser Aluminum & Chemical Corp.
Skill in communications is of increasing importance

H. Y. BASSETT, president
Calumet & Hecla Inc.
Develop a personal plan with respect to your future in the company

WHAT does it take to get to the top in a company?
WHAT common shortcomings impede the advancement of middle managers?

To get the answers to those admittedly tough questions, STEEL went to leading metalworking managers like Logan T. Johnston, president, Armco Steel Corp., and Peter G. Peterson, president, Bell & Howell Co.

Two findings stand out: Statistically, your chances of reaching the top are pretty slim because you have a lot of competition. But you can change the odds in your favor by concentrating on those things that separate the heirs apparent from the also-rans.

Mr. Johnston, for example, offers these observations and suggestions:

Men of Action

"Most middle managers are aggressive, keenly competitive, analytical, and capable of fast, accurate decision making. They are well versed in technology and the mechanics of their work . . . They are also among the most dedicated and loyal members of corporate endeavor. In my view, the middle manager is the backbone of the corporation, the most important catalyst for company action.

"Being such a man, however, he often has some inherent . . . blind spots which not only can retard his personal progress but also inhibit the dynamic imagination necessary to corporate success.

"Foremost is the tendency to be 'men of action.' Knowing the mechanics of their operations, middle managers tend to do too many things themselves rather than delegate to subordinates. This major paradox must be recognized: As a manager's responsibility and rank increase, he must leave his ability as a 'doer' behind him."

Creativity—a Must

The capacity for creativity and innovation is the trait most emphasized by the executives STEEL talked to.

Bell & Howell's Mr. Peterson comments: "We see the increasing need for the kind of mind that asks the tough question: 'Why do we do things this way?' We need minds that come up with fresh, new, creative approaches for the solution of old problems—whether in marketing, engineering, finance, or manufacturing.

"Admittedly, the truly creative mind is in the minority. I suspect, however, that there are many people more creative than we realize. It may be due either to their reticence in bringing forth their proposals, or our own failure to produce an environment within which they feel encouraged—or even compelled—to make their thoughts known."

Closely akin is the ability to communicate. Advises Mr. Peterson: "Study, practice, and master the arts of communication so that as you present and press your ideas, you do not destroy the human relationships that are essential to bringing the ideas into practice."

Take a Broader View

The climb up the management ladder requires the ability to move from a specialized activity into a broader service, points out L. B. Worthington, president, U. S. Steel Corp. "This quality," he adds, "includes a flexible willingness to be of service in areas of administration that may not be directly within the specialization of the individual."

Suggests Mark W. Cresap Jr., president, Westinghouse Electric Corp.: "Learn in reasonable detail how the different functions in other activities of your department are handled. Gage your contribution to the department's profitability by the yardstick measuring the department manager's performance,

PETER G. PETERSON, president
Bell & Howell Co.

Innovation—one of the key characteristics of the future top manager

FRED L. RIGGIN JR., president
Mueller Brass Co.

A willingness and ability to develop capable successors are required

JOSEPH B. LANTERMAN, president
American Steel Foundries

Men cannot sit back and expect "to be developed"

not the yardstick measuring your performance."

Armco's Mr. Johnston relates this incident. A middle manager once complained that his job was like riding thorugh space in a capsule full of instruments that needed constant attention. The manager lamented that there was no time to see what was going on outside. Mr. Johnston offered this advice: "Perhaps you need to redesign your capsule."

• **Outside Contact**—To help in the transition of developing from a "talented specialist to a talented generalist," Joseph B. Lanterman, president, American Steel Foundries, urges managers to take part in management seminars and university executive development courses. "Perhaps the greatest value of these programs is the opportunity for participants to examine ideas of executives from other functions, companies, and industries," he says. "The expanded view of company operations has become a prime requisite. It's often necessary to examine many facets of business, such as finance, engineering, production, design, law, sales, personnel, and public relations, before a sound solution is reached."

E. J. Hanley, president, Allegheny Ludlum Steel Corp., adds another facet of broadening the manager—extracurricular activities, such as participation in professional societies and civic affairs.

Traits of a Leader

"The need was never greater for a continuously inspiring leadership, building confident, enthusiastic, and purposeful individuals," challenges D. A. Rhoades, president, Kaiser Aluminum & Chemical Corp. "The very nature of the large and complex institutions, with their increasing interdependence, makes it more difficult for individuals to see a unity of purpose and to feel individually worthwhile . . . If the manager does not consider and find ways of meeting these inherent needs, frustration, insecurity, and lack of purpose grow easily."

A manager must be a professional. Charges Armco's Mr. Johnston: "The obligations of any manager extend far beyond any sales chart or research project. They include his personal responsibility for the business conduct of his subordinates. Every manager possesses the awesome power to give purpose to an enterprise and to individuals and to shape the values by which they conduct affairs of the company. It is, therefore, critical for every manager to recognize that he must at

JOEL HUNTER, president
Crucible Steel Co. of America

Ask yourself, "Can my department do a little bit more?"

LOGAN T. JOHNSTON, president
Armco Steel Corp.

He must be a professional—this includes personal responsibility for the business conduct of his subordinates

E. J. HANLEY, president
Allegheny Ludlum Steel Corp.

Important are extracurricular things such as work in professional societies and civic affairs

BIRNY MASON JR., president
Union Carbide Corp.

Be concerned about the welfare of the enterprise beyond the limits of your own function or specialty

all costs practice what he preaches and lead by example rather than edict."

• **Sacrifices Necessary** — "Most people are ambitious," observes H. Y. Bassett, president, Calumet & Hecla Inc., "but it has been rather amazing to me to see how many of them, anxious to succeed, are unwilling to make the sacrifices necessary in time, effort, money, disruption of home life and leisure activities."

He also cites the "self-satisfaction" of a manager who reaches the upper middle management level. The manager seems to act as if his ambitions have been fulfilled, or he seems to develop the attitude that future advancement will be automatic.

A complete change in attitude and approach becomes apparent. "The zip and drive seem to disappear, and while their abiilty to do their jobs is not greatly impaired, their opportunities for advancement are pretty well eliminated," says Mr. Bassett.

Concentrate on Present

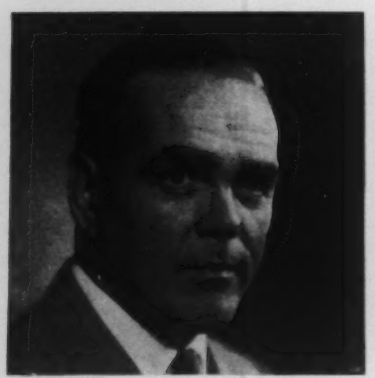
"I have a feeling that undue concentration on 'becoming president' defeats the efforts of many people," cautions Bell & Howell's Mr. Peterson. "The concentration that is priceless, and which will result in the highest achievements, is that of a manager doing his best on whatever assignment he's on."

Joel Hunter, president, Crucible Steel Co. of America, suggests that managers practice an elementary philosophy. Ask yourself daily: "Is my department doing all it can possibly do—or could it do a little bit more?"

• **Accountability**—Many company executives agree with W. Cordes Snyder Jr., chairman and president, Blaw-Knox Co. He believes that the failure to accept responsibility and insufficient attention to planning are among the most common shortcomings of middle managers.

Said one: "Too often we see men divest themselves of personal accountability by proceeding strictly by the book. Failure to take the initiative—inaction in the presence of the need for action—is frequently blamed on 'the policy' or the lack of one. We want men who feel personally accountable and who can take the risks that go with accountability."

Rodney C. Gott, executive vice president, American Machine & Foundry Co., cites another related shortcoming. Many middle managers tend to rely too much on top management for solutions to problems. Instead, they should be exercising



MARK W. CRESAP JR., president
Westinghouse Electric Corp.

Learn in reasonable detail how different functions are handled in other activities of your department

L. B. WORTHINGTON, president
U. S. Steel Corp.

It takes ability to move from specialized activity into a broader service

WADE N. HARRIS, president
Midland-Ross Corp.

The difficulty seems to be to find men who can make the personal sacrifices required

maximum ingenuity in recommending solutions to help top management make decisions.

Who'll succeed you if you are promoted?

That is an important question middle managers must ask themselves. You must have a willingness and ability to develop capable successors, give subordinates the opportunity to prove themselves, help them overcome weak points, and build their confidence . . . You must recognize that your advancement depends mostly on the record of your department and the availability of a competent replacement, stresses Fred L. Riggin Jr., president, Mueller Brass Co.

● **Set Personal Goals**—Calumet & Hecla's Mr. Bassett suggests that managers who participate in planning activities often fail to apply the same technique to their personal activities. He recommends these steps:

1. Determine your strong and weak points by consulting with your superiors, associates, or outside specialists. Then develop a program for self-improvement.

2. Set up your own timetable and objectives. Study the company to determine its growth potential and the opportunities for advancement and relate them to your job objectives.

3. Study the requirements of your job objectives and develop a plan for preparation to meet the requirements. Considerable outside study may be required.

4. Periodically evaluate your progress. Recheck objectives and job requirements, so that adjustments can be made to help you keep pace with technology and practices in your field of interest.

C. L. Holbert, president, H. K. Porter Company Inc., emphasizes a final point. The qualities that make a middle manager a potential candidate for a top executive post are pretty elusive. As in sports or literature, the qualities that separate the truly great or champion from the average or unsuccessful person are those that must be developed by the individual himself.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

A Recruiter Lays It On the Line

"I think we should make it clear that industry owes a man absolutely nothing," emphasizes Lon D. Barton, president, Cadillac Associates Inc., Chicago recruiting firm.

"Loyalty, tenure, and devotion to duty are simply not the *sine qua non* of top management. Ability is still the clincher. I frankly am becoming exasperated by the number of men who come into our office feeling the boss owes them a shot at the top . . . that they should be handed advancement on a silver platter because they have served time with the company.

"The top is a very small, precarious place. But there's room for the man with ability."

Burroughs Goes After Data Processing Market

BURROUGHS CORP., Detroit, announced its entry into the punched card electronic computer business last week. The company says it is aiming at the bulk of the data processing equipment market by providing moderately priced systems which offer advantages previously available only in more costly units.

Concentrating on increased compatibility between electronic and electromechanical units, Burroughs will offer four solid state computers. A "workhorse computer," the B260 system, is for medium and large scale punched card applications. The B250 system includes a hard-copy record processor in addition to punched card handling equipment, and the B270 accepts documents encoded with magnetic ink as well as punched cards. The B280 is a magnetic tape system.

Westinghouse Files Suit Countering TVA Claims

A COUNTERSUIT for more than $31 million has been filed by Westinghouse Electric Corp. against the Tennessee Valley Authority. In July, TVA sued the company for $20 million, claiming Westinghouse did not meet efficiency guarantees on steam generators for three, TVA steam plants.

The countersuit contends that specifications were changed after contracts were awarded, and Westinghouse seeks payment for costs of modifying the equipment.

● **TVA Claims**—Machinery defects and service breakdowns plus operational and load limitations have resulted in excessive repairs and expenses for obtaining replacement power, says TVA.

The company conceded the units did not meet efficiency requirements after they went into operation in 1953, but it says changes were made to meet the specifications. Westinghouse seeks reimbursement for providing excess kilowatt capacity for turbine generators, expenses for spare rotors, and other work.

Army Seeks Two Builders for M-113 Carriers... Will FRB Tighten Money Next Spring?... Bomber Money Held Up

WATCH for the Army to let big contracts for the M-113, armored personnel carrier. The vehicle is to be bought in "substantial" numbers this year to speed up the Army's modernization program (see STEEL, Sept. 11, p. 59).

The Army is seeking two new sources for the vehicle. FMC Corp., San Jose, Calif. (formerly Food Machinery & Chemical Corp.) has been the sole source—it received about $115 million worth of orders for 4000 carriers.

FMC will get a minimum follow-on order.

The two new sources must be dispersed. That means only one new prime contractor can be in the Detroit area, which is a logical place for the Army to look for a new source.

The procedure for awarding the new contracts will be similar to that used when the Army sought a new contractor for the M-14 rifle. First, the Army will hold a meeting of all contractors desiring to participate in the program and appear to have the capability to handle the big production job. Then a number of them will be asked to submit bids. In the case of the M-14, about 20 of the 53 companies at the first Army presentation submitted bids.

Final determination of the two winners will be influenced by the dispersion requirement, whether the firms are in labor surplus areas, their need for Army help in equipping the production lines, their financial strength, their subcontracting policies, and their general management capability, as well as their bid price.

The vehicle is tracked, weighs 18,600 lb, uses aluminum armor, has other aluminum components, and goes 38 mph.

● **MACHINE TOOL WAGES**—The machine tool industry is facing a minimum wage determination by Labor Secretary Arthur Goldberg that could put many companies in "real trouble," worries one industry source.

The industry now has until Oct. 18 to file a new brief requesting a new survey of the industry by the Labor Department. One source reports machine tool builders consistently overstated the wages paid by about 25 cents per hour on the first survey because they did not understand the questionnaire. Insiders expect Secretary Goldberg's minimum wage determination to be one of the highest in history, at least $1.75 per hour. Related development: Secretary Goldberg plans to speed up the whole Walsh-Healey process so that determinations can be made within one year. Industry worries it won't have sufficient time to develop its case under the speedup.

● **FRB ACTION DUE IN MARCH?**—Economists at the Commerce Department and the President's Council of Economic Advisers express a common theme these days: Inflation. Here's how one top official analyzes the situation. The boom that we expected in 1960 is about ready to start rolling now. Even the lack of consumer spending for durable goods doesn't worry him because service spending makes up for it. Industrial construction, capital spending, and government spending are seen as the areas which will lead the new boom (see Page 97). This government official figures the Kennedy administration will pump an extra $7 billion into the economy in fiscal 1962 (the year which began in July) for the purchase of goods and services. He says another extra $3 billion will be spent in the form of speeded up welfare benefits of all kinds. He concludes that gross national product will rise faster next year than it did this year.

He makes this flat prediction: The Federal Reserve Board will institute deflationary moves by March or April of 1962.

● **BOMBER MONEY HELD UP**—B-52 and B-58 production lines will be shut down in September and October, 1962, unless Defense Secretary McNamara acts to use the $700 million Congress authorized him to spend on bombers this fiscal year. The money was not requested by the secretary because more missiles are becoming operational.

Look for the secretary to announce his decision by Oct. 15. The outlook: He will continue to say the bombers aren't needed. He could ask Congress for permission to spend the extra money on other programs.

● **TRANSPORTATION REPORT COMING**—Commerce Secretary Luther Hodges has the job of drafting a transportation report to the President by Nov. 1. It will cover rail, truck, air, bus, and waterway systems. The President then expects to make recommendations to Congress early in 1962 for a new look at the nation's over-all transportation system. The complex problems of transportation, already studied and restudied by the Eisenhower administration, Congress, and White House Adviser James Landis, will probably not be handled by creating a new cabinet level position ("secretary of transportation"), as some critics advocate.

Look for Mr. Kennedy to come in with a series of steps designed to solve problems of segments of the industry, without attempting over-all co-ordination: For example, he will recommend more liberal depreciation policies for the railroads.

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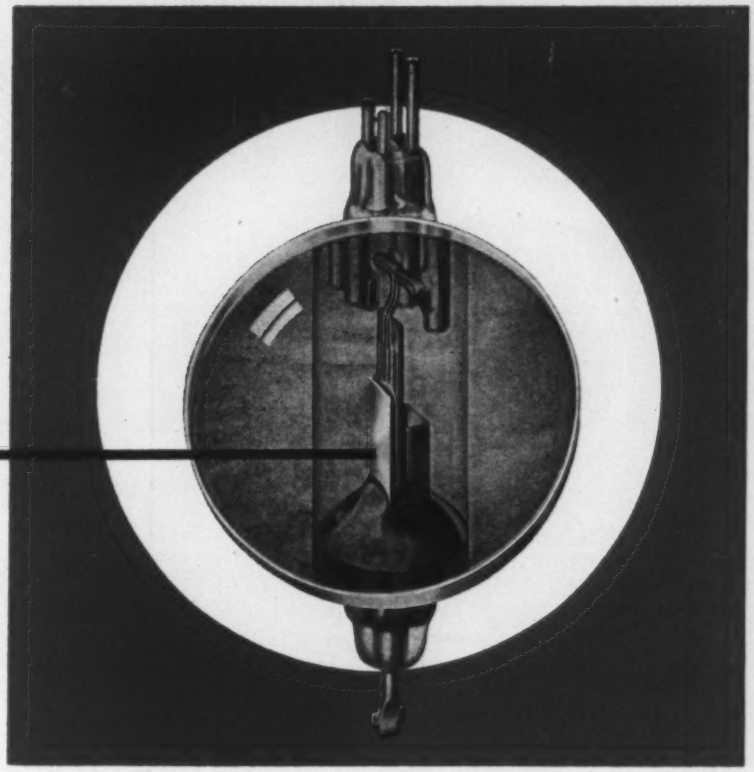


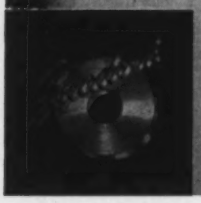
Here is another example of the extraordinary fatigue life you can get from Sandvik Spring Steel.

C. P. CLARE & CO. uses Sandvik 12W12C1 Steel as the spring support for the armature assembly in their line of Mercury-Wetted Contact Relays. Here, from a letter by Mr. C. H. Smith is what they say about it.

"The steel piece deflects through a complete cycle – once for each operation of the relay. Sandvik Steel was chosen for its excellent fatigue resistance. When you realize Clare HG relays have a life expectancy measured in billions of operations you can see the importance we place on selecting top grade materials."

The steel used for this application is only one of Sandvik's many types of specialty spring steels. Each type provides consistent, predictable results for a specific range of application.

For more information on Sandvik Specialty Steels and how they can be applied advantageously, use the coupon below or send us a note on your letterhead.



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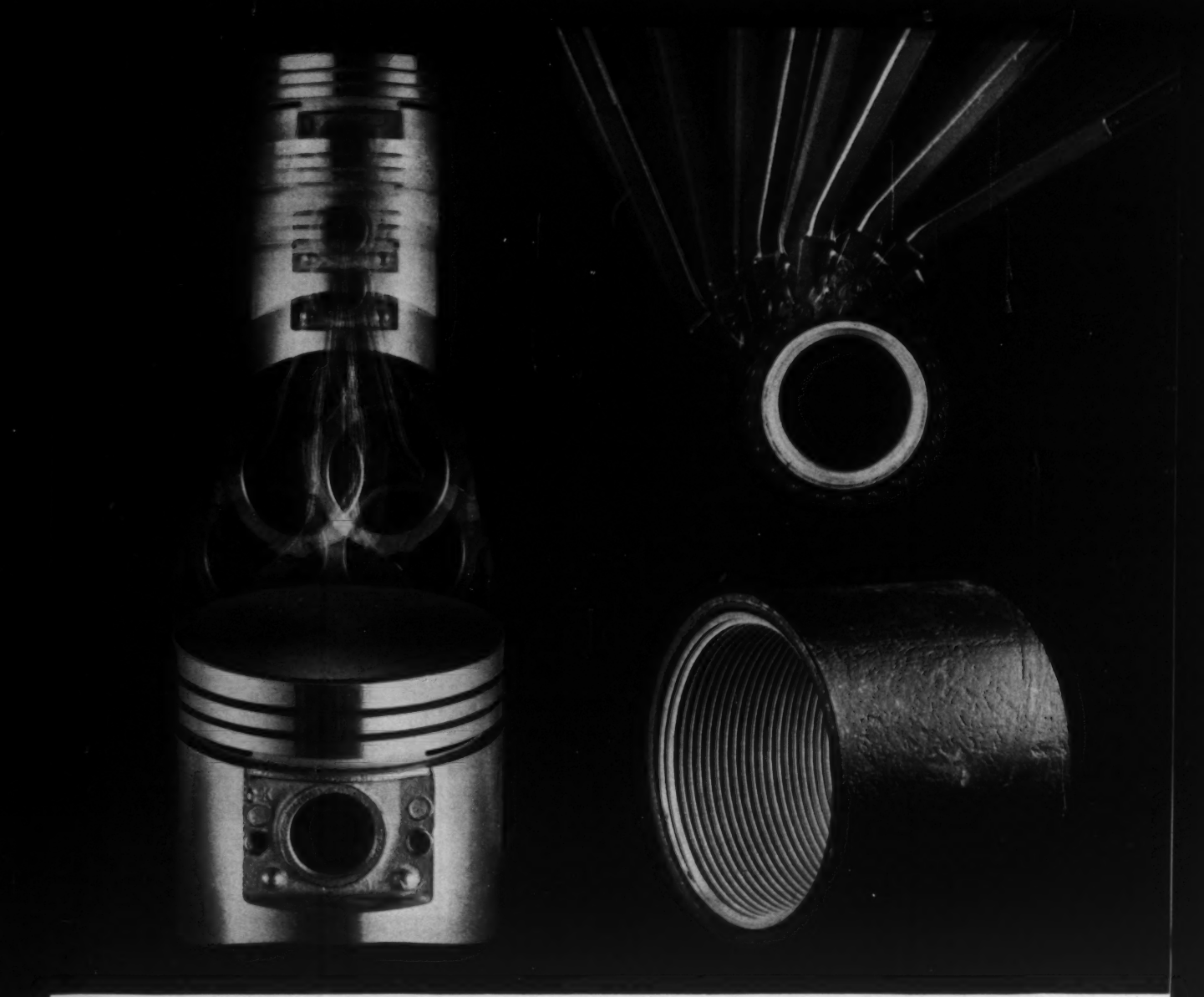

Valuable "lubricating" effects obtained with thin layer of tin

These two applications illustrate the physical advantage of a thin layer of tin. Both benefit from its low cost lubricating effect.

In the case of the piston, the soft tin is applied by an immersion process. It promotes wear-in without scoring. This lubricating effect guards against the engine break-in damage that was so costly years ago.

In the case of pipe couplings, tin electrodeposited on threads assures tightly sealed joints that do not seize or "freeze." It permits connection to be made or broken with less effort, minimizes high pressure leakage in pipe such as that used in oil country.

Perhaps these examples of the lubricating effects of tin suggest applications to your products. Substantial benefits may be obtained at very low cost.

With over 50 years experience in tin technology, M&T is the leading manufacturer of tin anodes and potassium and sodium stannates for electrotinning and immersion tinning. Ask an M&T engineer for help in adapting the lubricating effects of tin to your products or for information about the complete M&T "package" for tin plating.

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Can You Sell to the Have-Not Nations?

No. 19 in 1961's Management Series STEEL

The first step into foreign markets for most firms is the establishment of beachheads in the industrialized countries. But developing nations have been picked as major targets by some successful world traders. And they're not just producers of soda pop and textiles. Take, for example, U.S. exports of machinery. This listing, prepared by the National Industrial Conference Board, shows that, in 1960, two-fifths of our exports of machinery went to the less developed parts of the world.

Based on machinery exports totaling $4.1 billion. Includes electrical machinery and apparatus; power generating machinery; construction, mining, oil field, and related machinery; machine tools and other metalworking machinery; textile, sewing, and shoe machinery; other industrial machinery; office, accounting, and computing machinery, printing and bookbinding machinery; agricultural implements and tractors.

INDUSTRIALIZED NATIONS — 59.2%

CANADA	25.8%
UNITED KINGDOM	4.3%
JAPAN	4.2%
WEST GERMANY	3.7%
AUSTRALIA	3.2%
FRANCE	2.8%
ITALY	2.5%
Other Industrialized Nations*	12.7%

*Other industrialized nations include New Zealand, Union of South Africa, and the countries of Western Europe not shown separately.

DEVELOPING NATIONS — 40.8%

MEXICO	5.9%
ARGENTINA	4.0%
VENEZUELA	3.9%
BRAZIL	3.6%
INDIA & PAKISTAN	2.6%
Other Developing Nations	20.8%

Export for Profit Growth . . . No. 2

OF THE 3 billion people in the world today, only 1 in 4 lives in an industrialized nation. The other 2.2 billion represent one of U. S. industry's great marketing challenges.

To a growing, though still small, group of U. S. manufacturers, that potential seems lucrative enough to induce those firms to begin market development programs in the underdeveloped nations. As Neil McElroy, chairman, Procter & Gamble Co., and former U. S. secretary of defense, told the International Industrial Conference in San Francisco this month: "What greater incentive for market development could there be than the potential represented by that large part of the world's population striving now to find the means of becoming effective customers?"

Or, as S. J. Rundt, New York consultant on international business, has pointed out: "Those who but a short while ago neglected the lesser sales territories abroad, will have to start cultivating them because several small markets are insurance against a dropoff in a big market and many tiny markets can offset reversals in the biggest market."

It is, of course, true that industrialized countries are the best markets for other industrialized countries. On Sept. 11, STEEL devoted an article in its 1961 Management Series to that subject. In this article, we'll briefly explore the potential in the developing areas, then mention some of the important steps

U. S. exporters must take to enlarge their foreign markets.

Where the Markets Are

Few experienced exporters think of the developing countries as a group; the range of development is too great. Contrast, for example, Bhutan, a tiny, landlocked nation in the Himalayas that still operates on a barter basis, with Brazil, which is a prime market for U. S. goods. Between lie many markets that, if properly cultivated, could yield a profitable harvest for U. S. exporters.

Take, for example, the seven countries that make up the new Latin American Free Trade Association—Argentina, Brazil, Chile, Mexico, Paraguay, Peru, and Uruguay. Their combined population is 144 million—three-fourths that of the U. S. Together, they imported $4.3 billion worth of goods in 1959, $1.8 million from the U. S.

If the experience of the European trade blocs is an indication, the economic growth of the countries in LAFTA will accelerate and those nations will become significantly better markets for U. S. metalworking. Similar growth might be expected in Colombia and Ecuador, which have indicated that they'll join the bloc (and some experts look for Venezuela to sign up also).

When you consider that only 6 per cent of the world's population lives in the U. S., and that living standards are rising around the world, it becomes apparent that the long term growth of many U. S. companies will depend on how effectively they cultivate the 94 per cent of their potential customers who live outside this country.

There are many indications that U. S. exporters aren't doing as good a sales job as they should. Take Panama, for example. U. S. goods accounted for 75 per cent of that nation's imports in 1949, but only 52 per cent in 1959. Such declines cannot be attributed solely to price. Example: U. S. firms had a good market for electric stoves in Costa Rica—until a West German firm discovered that the Costa Ricans preferred 110 volt stoves to the 220 volt units peddled by U. S. makers. Another example: The West Germans are shipping a sizable volume of refrigerators into Latin America. Reason: Not price, but the fact that

Developing Markets for U. S. Industry

Country	Population (Millions)	Primary Language	Purchases from U. S., 1960 (Millions)	Telephones in Use (Thousands)
Algeria	11.0	French	$23.7	178
Angola	4.6	Portuguese	10.6	8
Argentina	21.5	Spanish	347.2	1244
Bolivia	3.5	Spanish	24.5	21
Ceylon	9.6	Sinhalese	14.2	36
Chile	7.6	Spanish	194.6	184
Colombia	14.1	Spanish	243.8	266
Congo	14.2	Swahili	26.4	28
Dominican Republic	3.0	Spanish	41.2	19
Ecuador	4.3	Spanish	54.8	27
Egypt	25.3	Arabic	150.6	219
Formosa (Taiwan)	10.6	Mandarin	110.2	67
Greece	8.3	Greek	61.8	190
Guatemala	3.8	Spanish	62.4	22
Haiti	3.5	French	25.1	4
Iran	20.6	Farsi	117.2	93
Iraq	7.1	Arabic	36.9	46
Israel	2.1	Hebrew	118.4	102
Jamaica	1.7	English	47.4	33
Kuwait	0.2	Arabic	40.6	3
Lebanon	1.6	Arabic	44.2	45
Liberia	2.8	English	36.1	2
Malaya	6.7	Malay	17.5	70
Mexico	34.6	Spanish	802.4	492
Morocco	11.6	Arabic	34.1	130
Nicaragua	1.5	Spanish	29.5	8
Nigeria	34.3	English	25.5	37
Pakistan	92.6	Urdu	168.8	70
Peru	10.8	Spanish	142.1	102
Philippines	27.4	English	293.6	100
Portugal	9.1	Portuguese	38.4	365
Rhodesia & Nyasaland	8.3	English	14.6	106
Spain	30.1	Spanish	189.4	1641
Thailand	25.5	Thai	61.5	38
Tunisia	4.1	Arabic	21.2	25
Turkey	27.8	Turkish	124.8	260
Union of South Africa	15.8	English	276.8	780
Uruguay	2.7	Spanish	61.7	137
Venezuela	6.7	Spanish	547.6	180
South Vietnam	14.1	Vietnamese	52.9	n.a.

n.a.—not available.
Sources: United Nations, *World Almanac*, *The Worldmark Encyclopedia of the Nations*, U. S. Commerce Department, *World Telephones*, American Telephone & Telegraph Co.

the Germans provide an unadorned 5½ cu ft unit, while we try to sell our fancy, 12 cu ft jobs.

You Can Reach Them

Some U. S. exporters refuse to investigate certain foreign markets for reasons that were once valid, but no longer apply. For example, take the eight African countries formerly known as French West Africa—Ivory Coast, Togo, Dahomey, Niger, Upper Volta, Senegal, Mauritania, and Mali. France has been supplying about 70 per cent of their purchases from abroad. The close tie with France has discouraged U. S. firms. But a recent U. S. trade mission to the region reports "hopeful possibilities for U. S. goods."

How has the situation changed? 1. The countries have become politically independent. 2. Their foreign exchange procedures are being liberalized. 3. They are anxious for economic independence and broader commercial relations. 4. The transcending consideration is psychological. The citizens want progress and change—fast. Result: The U. S. trade mission found interest there in U. S. products such as air conditioners, small tools, beer, housewares, radios, construction equipment, motor vehicles, and a variety of other products.

Summarized the trade mission: "The challenge to U. S. exporters is similar to and no more difficult than the challenge to European industry when it attempts to enter such traditional U. S. markets as Canada, Venezuela, Haiti, and the Philippines. Success in the markets will require no techniques not already well known to progressive American exporters."

What are those techniques? Here are a few, which apply to any market in which you want to sell . . .

Design for the Market

Some world traders suggest that poor design loses more sales for U. S. manufacturers than does the price disadvantage at which we are often placed. Yet many firms have found that simple modifications make their existing products extremely attractive to foreign buyers. Examples:

- Sunbeam produces a Mixmaster for the European market with a dough-hook attachment, which permits the homemaker to produce a batter heavier than would be acceptable in the U. S. Sunbeam has also started marketing an electric razor that adapts, at the turn of a switch, to European voltages which range from 125 to 260.
- Borg-Warner International is selling a line of Norge refrigerators in Italy with a bottle tray large enough to accommodate wine bottles—and a lock on the door.

To properly design for the market means more than functional changes in the product. Your packaging, advertising, merchandising methods, and other factors must also be adapted to the situation. That demands a good knowledge of the market.

Factors to be studied include, in addition to market size and structure, such things as customs, traditions, daily habits, social musts and taboos, prides and prejudices, dislikes and preferences, cultural attitudes and inclinations, social structures and government systems, intellectual and religious concepts, financial practices, and commercial usages.

Failure to recognize such differences may result in such embarrassing incidents as that suffered by the U. S. firm that sent Christmas cards to its Moslem customers.

Edward Marcus dramatizes the problem in the July issue of *Journal of Marketing*. He points out that literacy rates in some parts of Africa are so low that the advertisement must concentrate on pictures or symbols rather than words. But a word of caution on that: He says some nationals who saw a baby's picture on a label thought the product was "ground-up baby." He also notes design adaptations for Africa including resizing picks and shovels and tailoring tractor seats to the slimmer-hipped African.

The absence of a large middle

What Do Developing Nations Buy?

This summary of leading U. S. exports to African nations (excluding Egypt) gives an indication . . .

	(Millions of dollars) 1959	1960
Iron & Steel and Metal Manufactures	16.3	29.6
Machinery	156.9	193.0
Electrical Apparatus	17.9	23.6
Industrial Machinery	101.9	118.9
Construction & Mining	50.5	64.3
Manufacturing & Service	31.2	40.3
Tractors & Parts	27.8	38.2
Autos, Parts & Accessories	47.8	65.2
Chemicals & Related Products	38.8	41.5
Rubber & Manufactures	11.9	12.0
Petroleum & Products	17.8	18.9
TOTAL EXPORTS	502.2	610.1

Are They Buying More?

There is a decided uptrend in U. S. exports to developing nations, as the listing at left—and this tabulation of U. S. exports to selected developing nations—indicate . . .

	(Millions of dollars) 1958	1959	1960
Total Africa	609.7	686.7	760.8
United Arab Republic*	52.0	105.9	150.4
Algeria	27.7	26.5	21.1
Tunisia	6.7	9.3	21.0
Libya	20.2	31.4	41.8
Canary Islands	2.5	5.9	13.3
Ghana	10.5	13.1	17.0
Nigeria†	23.0	17.9	25.5
Liberia[2]	18.4	22.3	36.0
British East Africa[1]	6.9	8.6	11.6
Mozambique	8.9	7.5	9.9
Congo	39.1	30.8	26.3
Rhodesia & Nyasaland	11.7	10.2	14.6

*Egyptian region. †Includes Cameroons. 1. Includes Kenya, Uganda, Tanganyika, and Zanzibar. 2. Does not include vessels transferred to Liberian registry. Source: Department of Commerce.

income group must be recognized in your marketing to the developing countries. As James L. Tyson, chief economist, ARB Surveys Inc., marketing research subsidiary of C-E-I-R Inc., points out: "This affects pricing and packaging greatly. Aspirin tablets packaged to be sold in papers of one or two tablets and cigarettes sold singly or in pairs are common packaging and pricing examples."

Adapt Marketing Methods

Commerce in Africa south of the Sahara is generally conducted at three levels. At the peak is the giant import or export firm. Small wholesalers make up the second level and the lowest level is the petty retailer or the street peddler. Only the giant trading firm has sufficient capital to carry a decent inventory. He might sell only 100 or so cigarettes at a time to the small wholesaler, who in turn might sell a dozen to the street peddler.

But the majority of U. S. metalworking exporters need not be concerned with that problem. Much more important is their need to inject some aggressiveness into their foreign marketing. Take, for example, the Guatemalan firm that wanted to buy a molding press. It sent inquiries to a German firm, a Japanese company, and several U. S. manufacturers. The Japanese firm replied immediately, giving full particulars; the German firm had an engineer visiting in Central America call on the Guatemalan. Not until 27 weeks after the specifications went out did the sole U. S. firm to reply contact the Guatemalan. The Japanese firm got the order.

Servicing methods sometimes need adaptation too. Philco International, for example, in selling appliances in France, has home service representatives call to instruct new owners and to make a followup check on whether the machine is functioning properly.

The Big Payoff

With good knowledge of the market and patient attention to detail, more and more U. S. metalworking companies are earning good returns on their foreign efforts. Classic examples:

• National Cash Register Co., whose products are sold in 120 countries, reported record exports in 1960. The firm's overseas sales have soared from $72 million in 1951 to $187 million last year.

• Texas Instruments Inc.'s overseas efforts accounted for 12 per cent of the company's 1960 dollar volume.

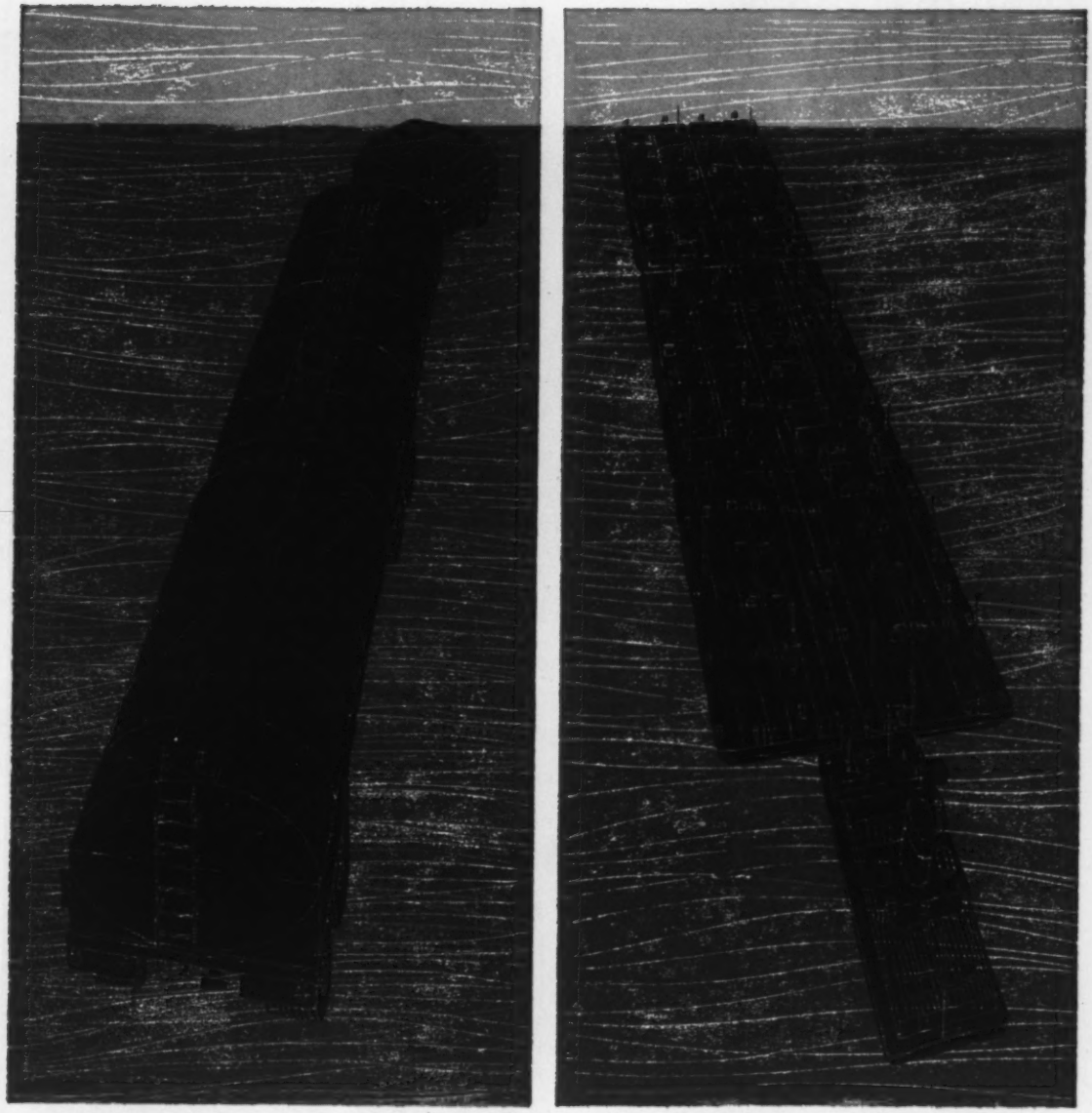
• W. G. Hunt & Co. in North Carolina, producer of printing devices with only one employee—Mr. Hunt—expects to sell 50 machines —35 per cent of total output—abroad this year.

PLAN FOR PROFIT GROWTH

Market for Profit Growth . . .

No. 1

On Oct. 9, STEEL will examine new dimensions needed in the marketing of industrial products. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



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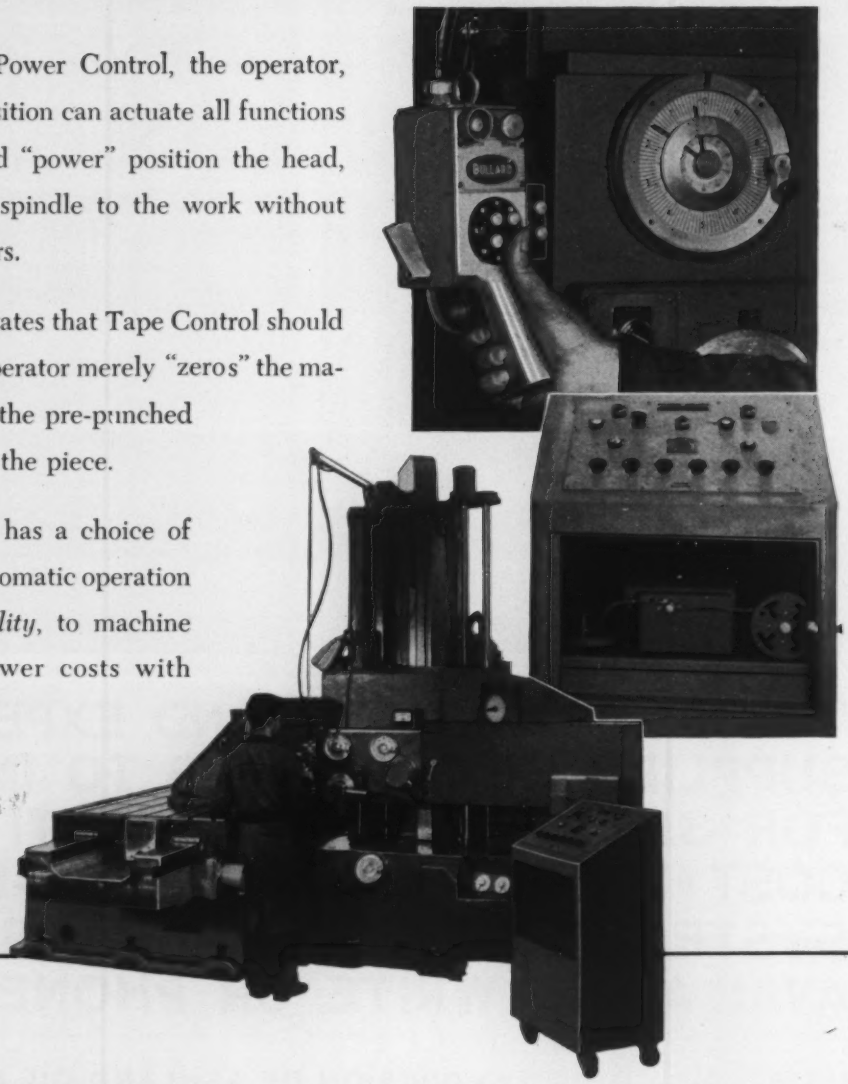

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Top Ten Imports

Imports Since 1946
(Thousands of units)

VW	568.3
RENAULT	227.4
ENGLISH FORDS	127.8
HILLMAN	85.9
FIAT	85.1
OPEL	81.5
MG	80.8
SIMCA	75.7
TRIUMPH	65.7
METROPOLITAN	65.4

VW cuts prices on Karmann Ghia as . . .

Import Survivors Find Going Tough

DETROIT is predicting sales of 400,000 imported cars next year. Carl H. Hahn, Volkswagen of America's general manager, agrees with the figure. (He also admits that his 500,000 unit estimate for 1961 was "overly optimistic.") Peter Nunez, general sales manager for Chrysler's Simca sales operation, pegs 1961 imports at 370,000 units. He thinks the market will level off at 300,000 cars annually by 1964.

Since the end of World War II, foreign automakers have put 2 million cars on U. S. highways. All but 204,000 of them have arrived since 1957. At the peak of the import onslaught (1959-60), more than 50 makes of cars were entering U. S. ports. Now less than 20 can be considered serious contenders. Half are luxury or sports cars which account for 85,000 sales a year. The table above shows the long term leaders.

Now it looks like the final shakeout is underway. The advent of U. S. compacts and the revival of interest in larger and fancier automobiles have put the squeeze on the more austere foreign offerings. The 12,000 dealers handling imports are finding that only those cars which show a particular foreign styling influence or those that have proved their reliability are attracting buyers.

English Ford registrations (6602 at the first of August) are two-thirds less than they were a year ago. The company appears to be phasing out those cars to make way for the Cardinal. It's due to appear in the spring despite the recent suggestion by Lee Iacocca, Ford Div. general manager, that the market for cars of this size may have shrunk below the profitability point. Ford will shoot for one-third of the present market with the Cardinal. (Planned volume is 110,000 units.)

VW Still Import King

To meet changing market conditions, Volkswagen will place more emphasis on its sporty Karmann Ghia coupe and convertible, says Mr. Hahn. The first step is to cut port of entry prices from $2430 to $2295 for the coupe and from $2695 to $2495 for the soft top. The reductions make it more competitive with Renault's Caravelle, a similar two seater runabout.

Ghia is built on the regular VW chassis, but it has a special body. Only 2400 were sold in this country when it was introduced in 1956. This year's sales are forecast at 11,000 units. Mr. Hahn predicts 15,000 Ghias will be delivered in 1962. Total VW imports will reach 235,000 vehicles next year. That's 27,000 more than 1961's anticipated sales and 17,000 more than 1960's. Mr. Hahn says 30,000 to 40,000

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will be trucks. The car sales alone will equal 3 per cent of a 6.5 million unit market. That's the level Volkswagen hopes to maintain in this country.

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	599,474	613,136
July	399,191	434,377
August	195,266	305,514
8 Mo. Totals	3,371,174	4,549,385
September		407,691
October		617,972
November		597,638
December		523,422
Total		6,696,108

Week Ended	1961	1960
Aug. 19	16,948	47,437
Aug. 26	61,401	38,952
Sept. 2	90,983	51,647
Sept. 9	83,421	52,635
Sept. 16	63,516†	85,879
Sept. 23	65,000*	120,722

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Having upped prices $30 on its two door sedan last March, VW doesn't plan further price adjustments. It won't change styling either, but it has added mechanical improvements.

Volkswagen continues to make its engine castings from magnesium. Each car uses 38 lb of the metal. About 90 per cent is purchased in the U. S. The company is pouring 100 tons of magnesium daily. A redesigned magnesium crankcase and transmission housing is 140 lb lighter than comparable gray iron parts.

The parent company expects to build 1.1 million vehicles next year (vs. 1 million in 1961). It will continue to spend $125 million annually for capital expansion of plant and facilities, and is still buying 5000 tons of steel from the U. S. each month.

Renault Raises Sales Sights

Renault holds second place among the imports even though its 1961 sales are expected to be 20,000 less than last year's 63,000 registrations. The company is aiming at 15 per cent of the import market (60,000 cars) next year, asserts Vincent Grob, executive vice president and general manager of the American sales subsidiary, Renault Inc. Eventually, Mr. Grob figures Renault will hold 20 per cent of this market.

The basic Dauphine line for 1962 will be officially introduced Oct. 25. Cars are little changed mechanically, but they sport some interior trim alterations.

Come spring, Renault will introduce its 4-L economy model. It is a basic transportation car featuring a permanently sealed cooling system, torsion bar suspension, and front wheel drive. It weighs 1322 lb and is powered by a four cylinder, in-line wet sleeve engine with an aluminum head. It turns out 26.5 hp.

Unlike Volkswagen, Renault does not plan to enter the compact truck market. Mr. Grob cites stiff competition from U. S. compacts.

Mr. Grob adds that the company plans to introduce another type of car to the U. S. market later in the year. It will also offer a special sports car version of the Caravelle which will be aimed at competition minded buyers.

Simca Banks on New Engine

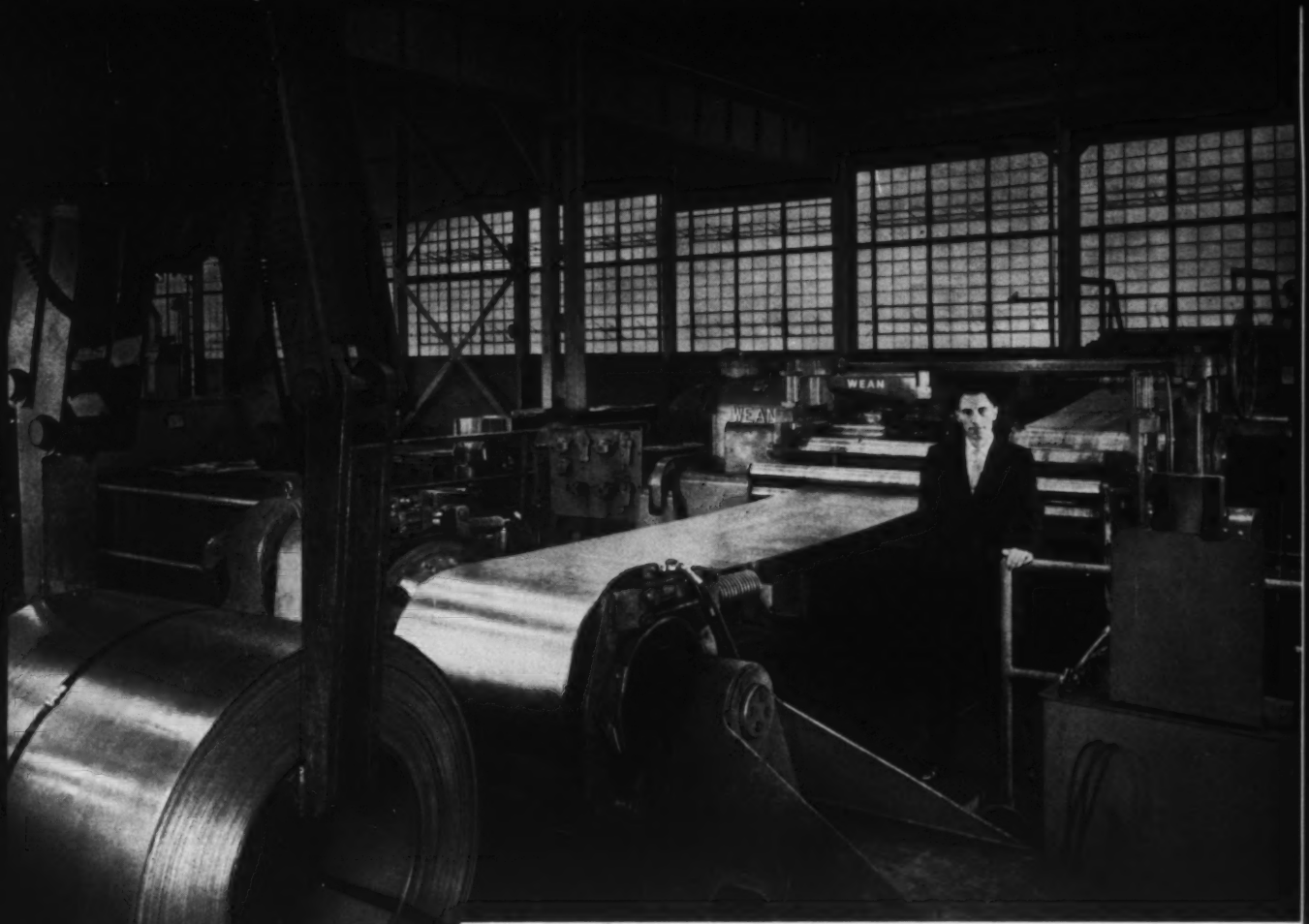
Chrysler's affiliated import, Simca, has been ailing to the point where many of its 530 dealers are offering $1200 deals on a car that ordinarily lists for $1658. Last year, Simca put 16,000 cars on U. S. highways compared with 32,000 in 1959. This year, it will be lucky to hit the 10,000 mark. Current registrations are less than 5000.

Nonetheless, Chrysler's Mr. Nunez is confident that the line can make a comeback in 1962. He makes no predictions but bases his hopes on the Simca 5, which has a redesigned 65 hp engine that features a crankshaft with five main bearings in place of the engine rated at 50 hp.

To allay criticism of service failures and part shortages, the Chrysler export outlet is setting up seven key dealers who will distribute parts and handle service. Mr. Nunez hopes to increase the number to 30 by the end of the year.

Body Design Minimizes Repair Time

THE NEW Renault R4L station wagon features easy access for loading and repairs. All five doors and the hood can be removed in seconds. Other body panels are welded, then bolted to the chassis. The sunroof, an optional feature, can be adjusted to open front or rear, or pulled to the center, as shown. Removal of the rear seat provides a 400 lb capacity, 50 cu ft storage area.



VAUGHN HAYES, Manager of Production Engineering, says:

"This Wean Slitting Line gives Chrysler Corporation's Twinsburg plant increased flexibility in production planning by allowing us to purchase standard size mill coils. We slit these coils to meet specific production requirements, eliminating special-width coil purchases. The line's 2,000 ton-per-month output helps us eliminate production delays and coil supply problems." Mr. Hayes' comments are typical of reasons why companies are using the *coil processing concept* to lower material costs, reduce inventory requirements and decrease scrap loss. If you process 500 tons or more per month of flat rolled metals, write for our new brochure entitled, "Coil Processing."

This brochure explains the concept and economics involved in *coil processing*. It also illustrates the types of Wean equipment that can help you cut inventory, production, and material costs when you process standard *mill* coils instead of sheets.

The McKay Machine Company, Youngstown 1, Ohio.

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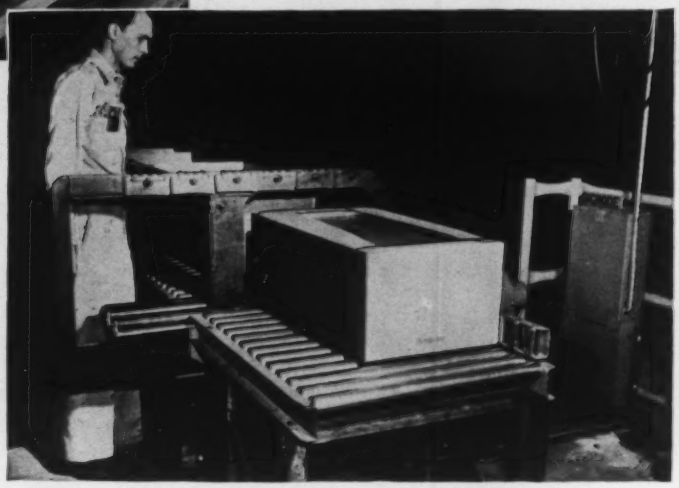
Long sheets of laminated plastic are paper wrapped, then edges are enclosed in strips of corrugated. Steel strapping is automatically applied at just the right tension to make a sturdy unit package. Savings in packaging costs are substantial, protection is practically perfect.

Operatorless strapping with a Signode M20 power strapping machine. Conveyor is powerized. Strap placement is controlled by a conductive ink mark on the package.

4 SIDES

Metal shelving and components are strapped in these containers that are open top and bottom. They are typically 3′ long, 1′ high, and from 9″ to 36″ wide. The same machine straps bundles of angles or posts that are only 3″ to 4″ square. Production is up almost four times, package unit cost is down, protection excellent.

One man and this foot-pedal-operated power strapping machine strap over 1100 containers a day. The machine has an adjustable strap chute to assure maximum strapping speed.



■ These three ways to save suggest what is accomplished when the strength of quality steel strapping is used with skill and imagination. Write for free Minimum Packaging Idea Kit.

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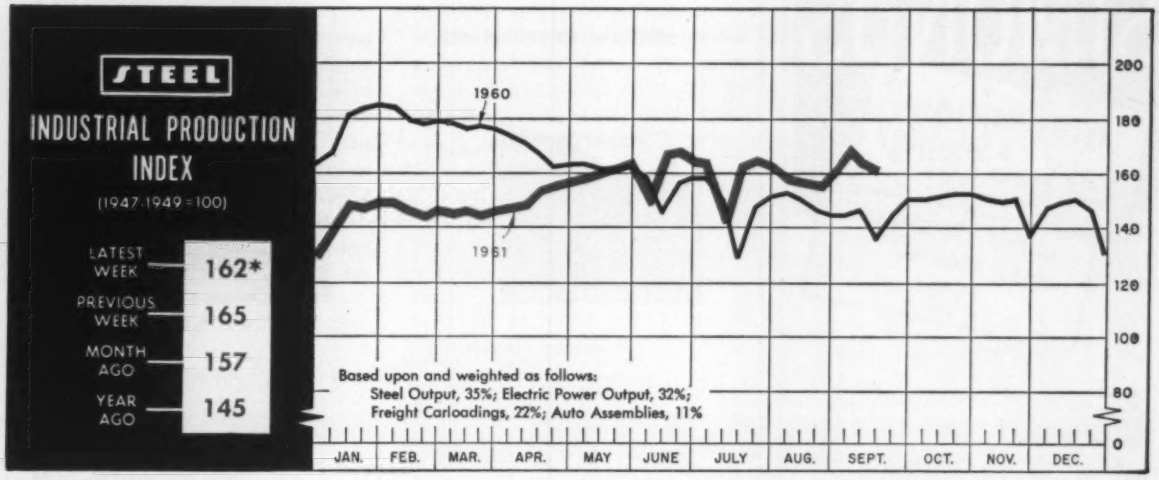

*Week ended Sept. 16.

Business Forecasts to Boost Optimism

LOOK for a marked increase in business optimism over the next two or three months. One reason: We are entering the forecasting season, and early indications are that it will be a dandy.

But optimism isn't worth much unless it is accompanied by concrete action to stimulate the economy. The two sectors most in need of stimulation are capital spending and consumer spending. A Department of Commerce report on plans for plant and equipment expenditures hints that the businessmen are responding. (See STEEL Sept. 18, p. 53.) Only the consumers still are dragging their feet, and practically all the experts feel that it's just a matter of time until the glowing reports (and significant boosts in hard cash over the last few months) will change this.

● **Early Birds**—In one of the early formal sessions, speakers at the forecast meeting of the Cleveland chapter of the American Marketing Association assured us that 1962 would be a record year for the overall economy and that several of the important metalworking sectors would be near their previous highs, if not above them. (See Page 97.)

They are not alone. Standard & Poor's sees gross national product (GNP) at a $527 billion annual rate this quarter, advancing to $541 billion in the fourth. Each of 1962's quarters will continue the trend, with the fourth period ending up at $580 billion. (GNP for 1960 was $504 billion.)

Commenting on the apparent lag in retail sales through the summer, S&P comments: "Our view is that the stage is being set for a rather sharp spurt in retail business—that the holiday season will be by far the best on record." (For more S&P forecasts, see table below.)

● **Corroboration** — The National Association of Credit Management (NACM) likewise sees a $540 billion annual rate for GNP by year-end, but sees a 4 per cent increase during 1962, which would put the figure up to $561 billion 15 months from now. The association counts on inventory rebuilding to take the

A Look Ahead at GNP

(Seasonally Adjusted at Annual Rates, Billions)

	1961 Quarters					1962 Quarters				
	1	2	3	4	Totals	1	2	3	4	Totals
GROSS NATIONAL PRODUCT	$501	$516	$527	$541	$521	$551	$564	$568	$580	$566
Personal Income	405	413	422	429	417	435	443	446	453	444
Disposable Income	354	362	370	376	366	379	386	388	395	387
Consumer Expenditures, Totals	331	336	342	348	339	353	358	361	368	360
Nondurable	154	154	156	158	156	160	161	163	165	162
Durable	39.4	42	43	45	42	46	48	46	48	47
Services	137	140	143	145	141	147	149	152	155	150
Government Expenditures, Totals	105	107	110	113	109	116	119	123	125	121
National Defense	47.2	49	50	52	50	54	56	58	59	57
Other Federal (net)	7.5	8.0	8.5	8.5	8.1	8.5	8.5	9.0	9.0	8.8
State and Local	50	51	52	53	51.5	54	55	56	57	55.5
Gross Private Domestic Investment	60	69	72	76	68.8	79	84	82	85	82.5
Private Construction	40	41	42	43	41.5	43	44	44	45	44
Producers' Durable Equip.	24	25	26	28	26	30	32	33	34	32.3
Investment in Inventory	−4.0	+2.8	+4.0	+5.0	+2.0	+6.0	+8.0	+5.0	+6.0	+6.0
Net Exports	5.3	3.9	3.0	3.0	4.0	3.0	3.0	2.0	2.0	2.5
Corporate Profits Before Taxes	39.6	42.6	45.0	49.0	44.0	52.0	54.0	53.0	55.0	54.0

Standard & Poor's. All but first and second quarters, 1961, estimated.

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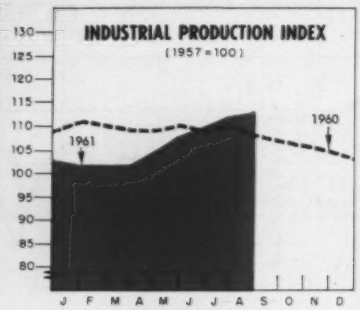
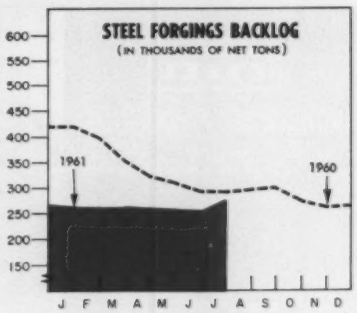
THE BUSINESS TREND



(Seasonally adjusted)

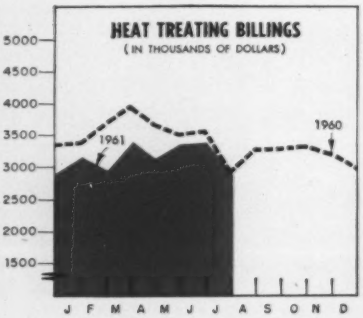
	Total Production		Total Mfg.		Durables Mfg.	
	1961	1960	1961	1960	1961	1960
Jan.	102	111	101	112	95	111
Feb.	102	110	101	110	94	109
Mar.	102	109	102	110	95	108
Apr.	105	109	105	109	99	106
May	108	110	108	110	103	107
June	110	109	111	110	105	105
July	112	110	112	110	107	106
Aug.	113*	108	113*	108	108*	104
Sept.	...	107	...	107	...	102
Oct.	...	106	...	106	...	101
Nov.	...	105	...	104	...	98
Dec.	...	103	...	103	...	96
Avg	...	108	...	108	...	104

Federal Reserve Board. *Preliminary.



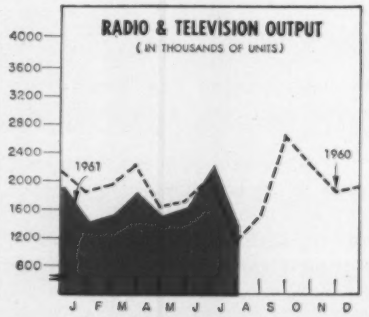
	Shipments		Unfilled Orders	
	1961	1960	1961	1960
Jan.	95	123	286	420
Feb.	89	130	263	398
Mar.	96	138	262	356
Apr.	96	117	264	325
May	105	110	262	312
June	108	110	259	295
July	72	79	282	295
Aug.	...	88	...	299
Sept.	...	94	...	302
Oct.	...	97	...	277
Nov.	...	93	...	265
Dec.	...	90	...	268

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.



	1961	1960	1959
Jan.	3,171.6	3,381.6	2,769.1
Feb.	2,942.3	3,698.8	2,828.0
Mar.	3,393.3	3,921.9	3,273.8
Apr.	3,140.9	3,642.6	3,316.1
May	3,370.4	3,594.3	3,302.8
June	3,386.8	3,546.7	3,512.2
July	2,880.8	2,906.5	3,302.1
Aug.	.....	3,266.0	3,162.8
Sept.	.....	3,281.7	3,263.8
Oct.	.....	3,306.8	3,531.2
Nov.	.....	3,165.5	3,092.2
Dec.	.....	2,925.2	3,357.2

Metal Treating Institute.



	Radio		Television	
	1961	1960	1961	1960
Jan.	1,090	1,356	368	526
Feb.	1,115	1,442	444	503
Mar.	1,384	1,668	497	550
Apr.	1,125	1,230	406	423
May	1,197	1,277	470	442
June	1,626	1,551	615	519
July	1,030	890	383	269
Aug.	....	1,048	...	462
Sept.	....	1,945	...	679
Oct.	....	1,728	...	500
Nov.	....	1,469	...	430
Dec.	....	1,522	...	405
Totals	....	17,126	...	5,708

Electronic Industries Association.

Charts copyright, 1961, STEEL.

economy to new highs. "Retail ratios of stocks to sales are unusually low, and reordering this fall can be . . . sharp. Indications are, too, that consumer spending will be done more freely this winter and spring."

In addition, the association looks for substantial boosts to come in defense spending for such metalworking items as autos, trucks, buses, Jeeps, tanks, tractors, troop carriers, earth moving equipment, aircraft, missiles and missile components, and shipbuilding.

• **Employment to Grow** — While employment has been disappointing so far in the recovery, it must be remembered that it always lags the

upturn by several months. As the Morgan Guaranty Trust Co. of New York points out, much of the increase in production in the last few months has come through a longer workweek and utilization of efficiencies which accompany every economic setback. Now that the workweek is back to a standard 40 hours, the bank economists predict that the "autumn and winter periods are likely to bring an appreciable decline in the seasonally adjusted unemployment rate" as manufacturers raise production sights.

• **Records to Fall**—The economy is already at a record level on the basis of the Federal Reserve Board's industrial production index. It climbed another point in August to a seasonally adjusted 113 per cent of the 1957 average. (See graph and table above.) While this was the smallest monthly gain since the recovery started last April, it is noteworthy that it again came from strength across the board, except for consumer durables. Nor is the small increment a sign that the uptrend has petered out.

Dr. John W. Harriman, economist for Tri-Continental Corp., New York investment company, says history shows that "production does not stop when it makes a record, but tends to continue on to a series of new highs. It is generally anticipated that the present recovery will follow the historical pattern with further strength and last longer than the abortive recovery of 1958-59." He feels certain that expansion is in store for government spending and consumer spending for nondurables and services. He is less sure of personal spending for durables, including housing, and business spending for plant and equipment.

• **Pattern Shaping Up** — Already certain patterns are forming in the predictions for some important metalworking industries. You can expect the range to run from 110 million to about 125 million tons for steel production in 1962; from 1.3 million to 1.5 million for new housing starts; and from 6.6 million to perhaps 7.5 million (units) retail sales of automobiles (domestic and foreign).

In next week's issue, STEEL's Panel of Economic Consultants will give its views for the next four quarters on eight major economic barometers.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,040[1]	2,032	1,547
Electric Power Distributed (million kw-hr)	15,400[1]	15,838	14,298
Bituminous Coal Output (1000 tons)	7,130[1]	8,095	6,704
Crude Oil Production (daily avg—1000 bbl)	7,175[1]	7,162	6,847
Construction Volume (*ENR*—millions)	$523.3	$268.9	$423.3
Auto, Truck Output—U. S., Canada (*Ward's*)	85,806[1]	106,433	109,822
TRADE			
Freight Carloadings (1000 cars)	600[1]	513	599
Intercity Truck Tonnage (changes from year ago)	+0.4%	+2.2%	+0.4%
Business Failures (Dun & Bradstreet)	275	321	276
Currency in Circulation (millions)[2]	$32,836	$32,663	$32,291
Dept. Store Sales (changes from year ago)[2]	−1%	+4%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,063	$23,952	$26,499
Federal Gross Debt (billions)	$293.5	$293.7	$288.6
Bond Volume, NYSE (millions)	$28.0	$22.5	$18.7
Stocks Sales, NYSE (thousands of shares)	14,897	13,786	12,072
Loans & Investments (billions, adjusted)[3]	$114.3	$114.3	$105.1
U. S. Govt. Obligations Held (billions)[3]	$33.3	$33.5	$27.4
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	226.9	227.4	230.0
All Commodities[6]	118.7	118.7	119.4
Commodities Other than Farm & Foods[6]	127.3	127.4	128.3

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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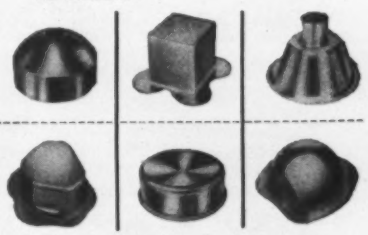

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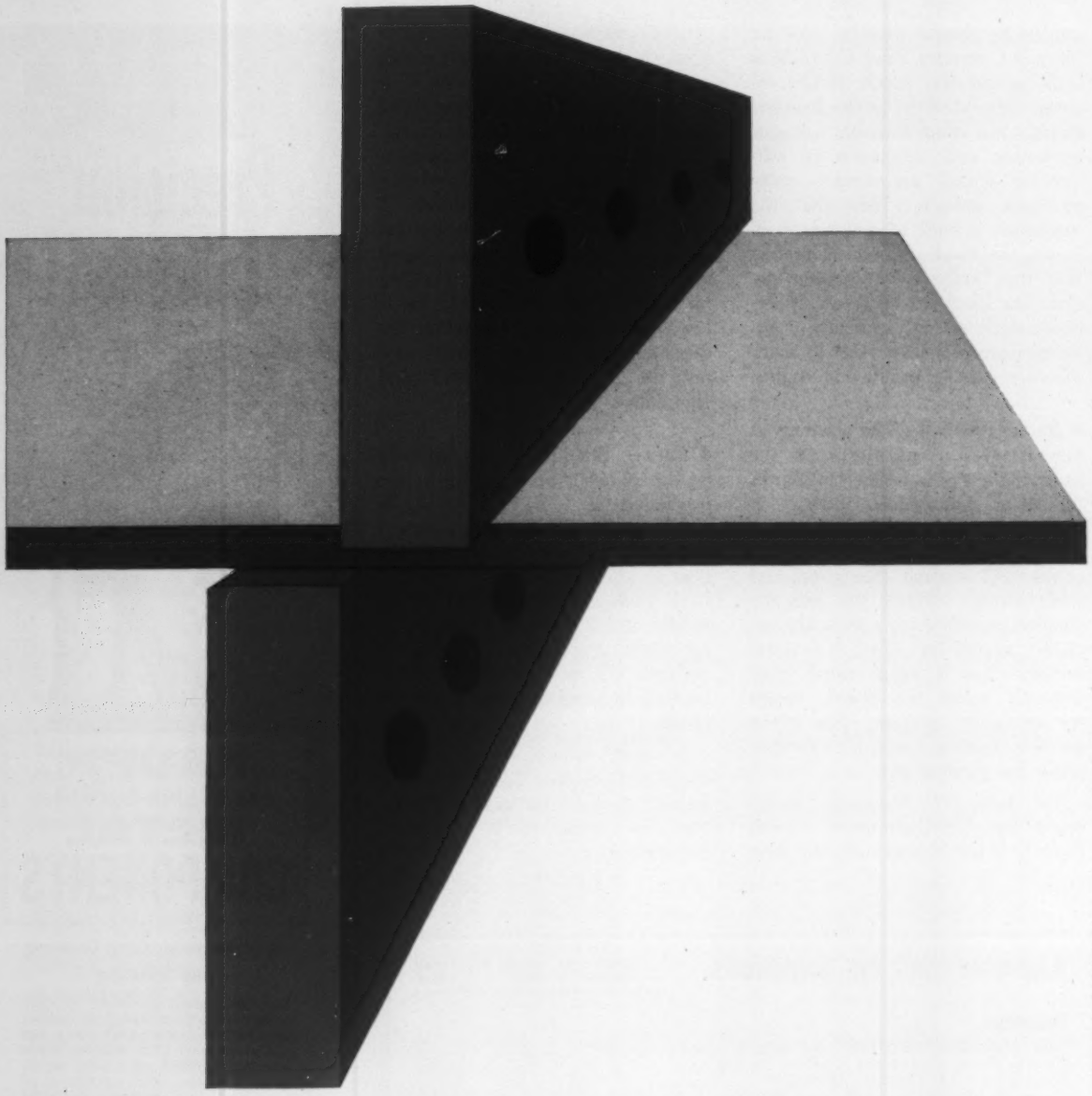
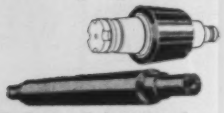
METAL CRAFTSMEN SINCE 1924



Heppenstall rolls it, cuts it, handles it



Back-up roll sleeves and forged hardened, ground rolls

Side trimmer knives

Motorized sheet lifter

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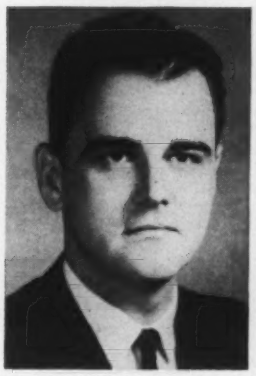
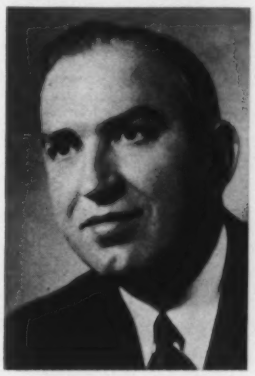
PATRICK L. McMANUS
Worthington div. gen. mgr.



WAYNE R. CERVENY
Norma-Hoffmann post

DONALD W. DAVIS
Stanley Works v. p.



DANIEL J. HAUGHTON
Lockheed Aircraft president

Patrick L. McManus was appointed general manager, Standard Pump Div., East Orange, N. J., **Worthington Corp.** He was director of marketing services at headquarters in Harrison, N. J.

Wayne R. Cerveny fills the new post of special products sales manager for **Norma-Hoffmann Bearings Corp.**, Stamford, Conn. He was sales engineer in upper New York state.

William S. Perkins was made director of purchases for the consumer products group of **Westinghouse Electric Corp.**, Pittsburgh.

Walter E. Rodriguez was named Export Dept. administrator for the Materials Handling Div. of **Yale & Towne Mfg. Co.**, Philadelphia.

Thomas Allchin was named to head a new Machinery Div. at **Fusion Engineering**, Cleveland. He has served with Osborn Mfg. Co. and F. J. Stokes Machine Co.

Donald W. Davis was elected a vice president, **Stanley Works**, New Britain, Conn. He continues as general manager, Stanley Steel Strapping Div.

Howard M. Vaill was named sales manager, Ansonia, Conn., Div., **Anaconda American Brass Co.** He succeeds **George W. Swentor** who joins the company's General Sales Dept. in Waterbury, Conn., on special assignment.

Orville G. Mahnensmith was made sales manager, Fill-Rite Div., **Tuthill Pump Co.**, Chicago. He was sales manager, Ossian Engineering Co., whose assets were acquired by Tuthill June 1.

John E. Brennan joined **Federal-Mogul-Bower Bearings Inc.**, Detroit, as a vice president of the corporation and general manager, International Div. He was a vice president of Chrysler Corp., and director of its manufacturing staff and services.

Daniel J. Haughton, executive vice president, was elected president of **Lockheed Aircraft Corp.**, Burbank, Calif. He succeeds **Courtland S. Gross**, now chairman. **Dudley E. Browne**, vice president-finance, was elevated to a group vice presidency.

Elmer W. Edstrand was made manager of the Kiln Div. of **Lindberg Engineering Co.**, Chicago.

Ray J. Stanish was made general sales manager for **TRW Computers Co.**, Los Angeles, a division of Thompson Ramo Wooldridge Inc.

Donald J. Sauser was made manager, aircraft sales, for **Cherry Rivet Div.**, Santa Ana, Calif., Townsend Co. He succeeds **J. H. Roy**, resigned.

Harry M. Horton was made sales manager for **Link-Belt Co.'s** Philadelphia plant. He succeeds the late **James H. Oakes. Alfred B. Schachte Jr.** was named assistant sales manager. **John J. Bradley**

WALTER E. RODRIGUEZ
Yale & Towne export post

THOMAS ALLCHIN
heads Fusion Eng. div.

JOHN E. BRENNAN
joins Federal-Mogul

HARRY M. HORTON
Link-Belt plant sales mgr.

JOHN F. McCARTHY
J&L department supt.

CHARLES J. RANDOLPH JR.
United Engineers div. post

ROBERT E. MORKEN
Hevi-Duty product mgr.

FOREST S. BURTCH
Roebling's gen. sales mgr.

succeeds Mr. Horton as district manager at Summit, N. J.

John F. McCarthy was made superintendent of the Blooming & Hot Strip Mills Dept. at the Cleveland Works of **Jones & Laughlin Steel Corp.** He was assistant superintendent of J&L blooming, hot strip and rolling mills, Aliquippa, Pa., Works. **Lawrence K. Ehringer** succeeds **R. A. Chorpenning,** retired, as superintendent, Marine Ways.

Robert O. Cooling was made head of international sales of **Titeflex Inc.,** Springfield, Mass.

Harry J. Bolwell was elected vice president of **Midland-Ross Corp.,** Cleveland, and general manager of its **Surface Combustion Div.** in Toledo, Ohio, where he will have offices. He succeeds **Eugene P. Heiles,** who will retire from the company early next year. Until then, Mr. Heiles continues as a vice president of M-R and will serve in an advisory capacity to Surface Combustion and other divisions of M-R.

Charles J. Randolph Jr. was made engineering manager, Chemical Div., **United Engineers & Constructors Inc.,** Philadelphia. He was with Girdler Corp., Louisville.

Robert E. Morken was made product manager in charge of melting furnace engineering and sales for **Hevi-Duty Electric Co.,** Watertown, Wis., division of Basic Products Corp. He was a consultant at Chrysler Corp. on heat treating and metal melting.

B. G. Tubbs, vice president of **Royal Industries Inc.,** was assigned to the corporate office in Los Angeles with responsibility for facilitating the current expansion program.

Burton W. Van Dyke was named to the new post of manager of manufacturing, **Standard Pressed Steel Co.,** Jenkintown, Pa. He was manufacturing manager of fastener products. **Paul Bane** was made manager of quality control. **O. Diston Lambirth** was named to the new post of manager of engineering.

Forest S. Burtch was made general sales manager, **John A. Roebling's Sons Div.,** Trenton, N. J., Colorado Fuel & Iron Corp. He was general product manager for Roebling's Construction Materials Div.

Robert L. Hoskinson fills the new post of director of corporate planning and control, **Douglas Aircraft Co.,** Santa Monica, Calif.

Lester G. Porter, executive vice president, **Borg-Warner Corp.,** Chicago, was elected president to succeed **Robert S. Ingersoll,** who was elected chairman and chief executive officer, effective Oct. 1. **Roy C. Ingersoll** will retire as chairman Sept. 30 and will fill the new post of honorary chairman.

R. S. Robinson was named to the new post of director of sales administration at **Allegheny Ludlum Steel Corp.,** Pittsburgh. He was administrative assistant to the vice president-sales. **J. A. Kennedy** was named manager of sales office administration.

HARRY J. BOLWELL
Midland-Ross v. p.

BURTON W. VAN DYKE
S-P-S manufacturing mgr.

LESTER G. PORTER
Borg-Warner president

R. S. ROBINSON
Allegheny Ludlum sales adm.

John S. Colter was made manager, Industrial Div., **Watts Regulator Co.**, Lawrence, Mass. He was resident sales engineer for Foxboro Co.

J. Walter Lautenberger Jr. was made chief engineer, **Malsbary Mfg. Co.**, Oakland, Calif.

Frank J. Valenti was named general sales manager, **Weighing & Controls Inc.**, Hatboro, Pa., subsidiary of CompuDyne Corp. He was sales manager of Trans-Weigh Co., which was purchased by CompuDyne.

F. C. Esty was made director of raw materials procurement for **Wyman-Gordon Co.**, Worcester, Mass. He was assistant works manager at the company's USAF leased plant at Grafton, Mass.

John M. Chalfant was named to head the newly organized department of foreign operations for **Package Machinery Co.**, East Longmeadow, Mass.

Robert E. Lindquist was named industrial sales manager for **Hills-McCanna Co.**, Carpentersville, Ill. He was Eastern regional sales manager.

John G. Norris fills the new post of assistant to the president, **Fansteel Metallurgical Corp.**, North Chicago, Ill.

Lloyd J. Bentley was made general superintendent of production at the Tonawanda, N. Y., engine plant of **Chevrolet Motor Div.**, General Motors Corp. Formerly a production superintendent at Chevrolet's Gear & Axle plant at Detroit, he succeeds **James W. McLernon**, recently made assistant manager of Chevrolet's Manufacturing Research & Development Dept., Detroit.

National Works, McKeesport, Pa., National Tube Div., U. S. Steel Corp., named **Jaye S. Gamble** division superintendent of blast furnaces, open hearth and bessemer and rolling mills. He is succeeded as chief metallurgist by **Walter A. Barres.** Mr. Gamble succeeds **J. P. Ely**, recently made assistant general superintendent at the plant.

Howard Strandberg was made assistant general sales manager, Refractories Div., Pittsburgh, **H. K. Porter Company Inc.**

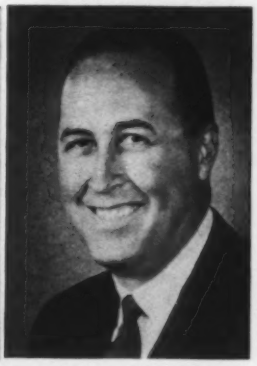
JOHN S. COLTER
Watts Regulator div. mgr.

J. WALTER LAUTENBERGER JR.
Malsbary Mfg. chief eng.

FRANK J. VALENTI
Weighing & Controls sales

F. C. ESTY
Wyman-Gordon procurement

LOUIS E. SARAZ
Republic div. engineer



L. O. WITZENBURG
Eaton divs. gen. sales mgr.

Louis E. Saraz was made chief metallurgical engineer, Bolt & Nut Div., **Republic Steel Corp.**, Cleveland. Former superintendent of quality control, he succeeds **A. C. Fearn**, retired. **Robert W. Engelbert** was made assistant chief engineer, Cleveland District, to succeed **R. T. Richmond**, named chief engineer at the Youngstown District steel plant. **F. R. Kyle** was made assistant superintendent, Open Hearth Dept., Cleveland District steel plant. He succeeds **E. G. Kondas**, named general superintendent, Chicago District steel plant.

Dayton A. Rogers was elected president and general manager, **Andrew Engineering Co.**, Minneapolis.

Louis B. Young was made general manager, Bendix Systems Div., Detroit, **Bendix Corp.** He succeeds **Roy J. Sandstrom**, recently promoted to the Bendix Mishawaka, Ind., Div., with broader executive responsibilities. Mr. Sandstrom replaced **R. E. Whiffen**, named general manager of Bendix Products-Aircraft Div., South Bend, Ind.

L. O. Witzenburg was promoted to general sales manager of the **Farval Div.** and **Cleveland Worm & Gear Div.** of Eaton Mfg. Co., Cleveland. **E. J. Gesdorf** was made sales manager, Farval; and **D. W. Leader** sales manager, Cleveland Worm & Gear. **Maurice J. Losh** was made assistant sales manager, and **John R. Dingle** assistant manager of CW&G.

Bowman Steel Corp., Pittsburgh, appointed **Kenneth C. Woodrow** plant manager.

Robert S. Baker was made manager of the Huntsville, Ala., computer center for **General Electric Co.**

OBITUARIES...

Paul A. Koehler, chief engineer, **Parker-Hannifin Corp.**, Cleveland, died Sept. 12.

Leon B. Rosseau, president, **Ajax Electric Co.**, Philadelphia, died Sept. 15.

Leonard Christie Jr., 51, production manager, **Babcock & Wilcox Co.**, New York, died Sept. 13.

Chrome
Plated
Steel

This mark tells you a product is made of modern, dependable Steel.

How a "specially tailored" strip reduces production rejects almost 25% for Kromex

Kromex, Inc., Cleveland, Ohio, turns out a complete line of pantry ware, but they were having trouble with a square, mirror-finish chromium-plated cake cover that was made with a single deep draw. Rejection rate was a stunning 25%. They first tried a No. 3 finish for this application, but because of the very deep draw and the dense and smooth surface, satisfactory lubrication was near impossible. The result: Excessive draw marks and breakage. A regular No. 2 finish was then tried. The draw was successful. But buffing and finishing costs were prohibitive for this application.

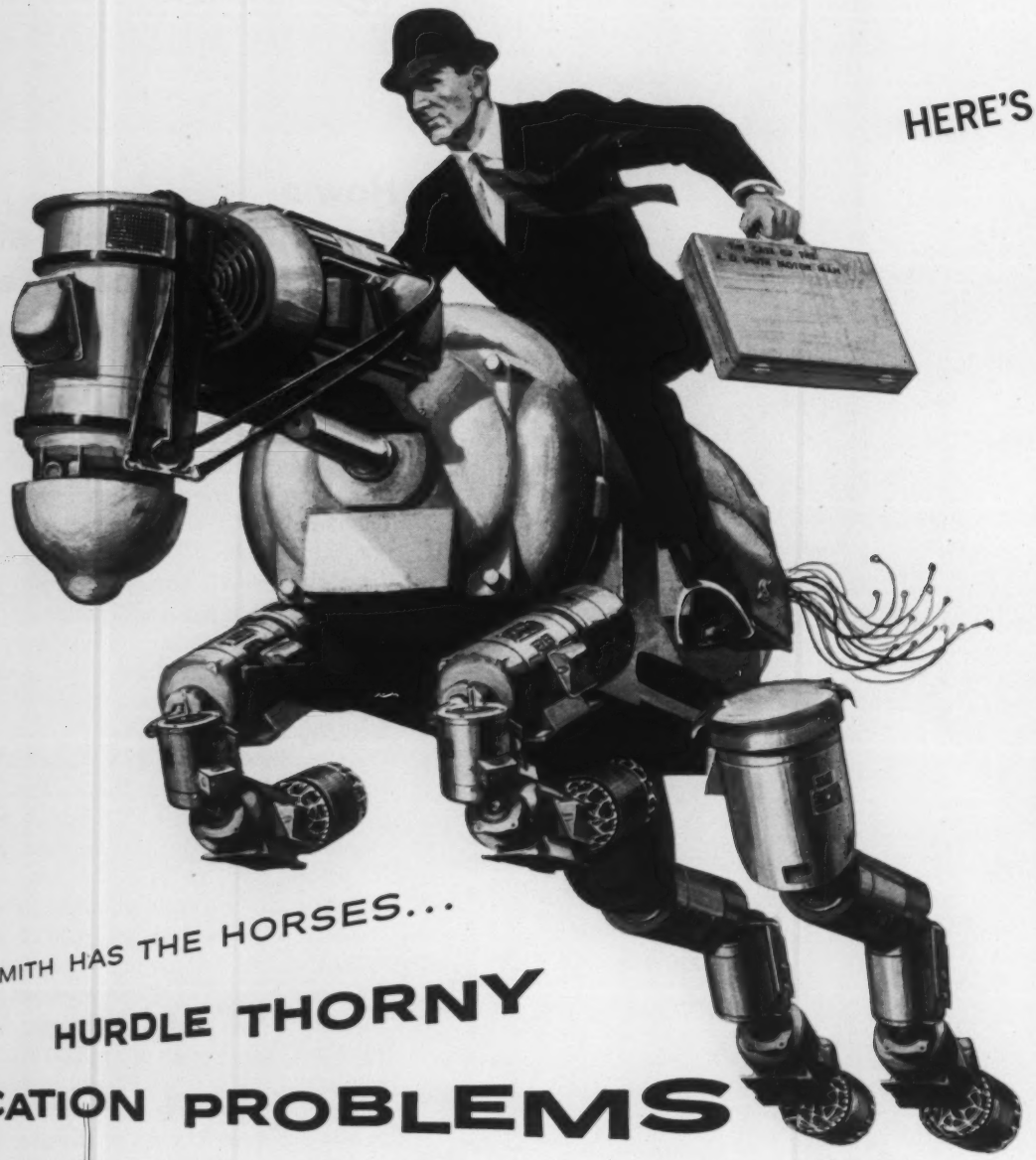
American Steel and Wire salesmen conferred with our Metallurgical Department and suggested a specially tailored No. 3 finish. Reject rate dropped to less than 1% because the special surface was able to hold lubricant evenly, but smooth enough to draw and plate flawlessly.

Kromex is one more example of how strip, *tailored to end use,* works to produce a better product at lower cost. When you buy strip, you're buying a specific chemistry, temper, dimension, edge and finish that is consistently uniform within the coil or from coil to coil. Certain of your processing steps may actually be eliminated by using cold rolled strip, produced in our mills, and tailor-made for your specific end use.

Take a hard look at your production line and let our salesmen and metallurgical people look too. There's a good chance you can improve quality and cut production costs at the same time with *tailored-to-the-job* cold rolled strip from American Steel and Wire. American Steel and Wire Division, Rockefeller Bldg., Cleveland 13, Ohio. *USS and American are registered trademarks.*

USS American Steel and Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors
United States Steel Export Company, Distributors Abroad



A. O. SMITH HAS THE HORSES...

HURDLE THORNY APPLICATION PROBLEMS

From the case of the A. O. Smith Motor Man

...a line of 800 to 1 hp favorites, built to make tough application problems seem easy

When it comes to building integral-motor-powered equipment, *make sure of your horsepower source!* Before you specify any motor brand, consult with your A. O. Smith Motor Man. He'll show you how the horses of A. O. Smith (single-phase integrals — 1-5 hp — polyphase — 1-800 hp) help users surmount application barriers.

And A. O. Smith delivers the horses that deliver the goods!

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Milwaukee 1, Wisconsin, U. S. A.

A CASE IN POINT

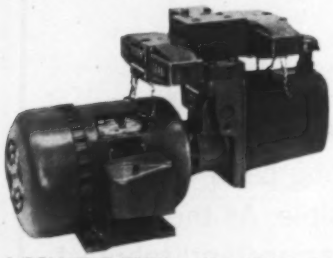
A TEAM THAT PULLS TOGETHER

Latest development in the industrial line of Vickers Inc. (Division of Sperry Rand Corporation) is its new PK line of motorized hydraulic power packages. These versatile units have a wide range of use on small machine tools, presses, paper machinery, textile machines plus countless other industrial applications.

Being "Jacks of all trades" PK power packs required a motor that would team up efficiently for all kinds of service—a motor that could operate on unusual applications yet still be custom-engineered for the particular job it had to do. Vickers had to be particular — that's why they chose A. O. Smith totally enclosed fan cooled motors.

A. O. Smith motors are current choices wherever a simple, compact, powerful unit is needed—in the case of Vickers PK, a motor built for years of reliable hydraulic power and control. Simple and compact because the entire package is close-coupled . . . with splined motor shaft for ease of assembly and disassembly. Reliable because of exclusive A. O. Smith TEFC features — die cast rotor, efficient cooling system, permanently lubricated bearings, reserve insulation protection.

You'll find it pays to team up with A. O. Smith motors — mechanically and electrically, you get more for your motor dollar when you put your money on the horses of A. O. Smith.



A RELIABLE TEAM — New Vickers PK motorized power pack powered by an A. O. Smith TEFC motor — a combination that runs without a hitch.

Second Electric Furnace to Add 180,000 Tons to Lukens' Capacity

LUKENS STEEL CO., Coatesville, Pa., will build a second, 100 ton, electric furnace which is scheduled to be operative within 12 months. The $6,250,000 project will include a scrap handling area, a mold stripper building, and a mold storage and preparation building.

United Engineers & Constructors Inc., Philadelphia, will erect the furnace adjacent to the company's other electric unit which was part of a $33 million expansion program completed early in 1959.

The excellent performance of the first electric furnace showed the wisdom of this kind of steelmaking equipment for the carbon and alloy steel plate products the company makes, says C. L. Huston Jr., president. "The project," he adds, "is another step by Lukens to keep competitive its cost of steel production and to provide a modern facility with the flexibility to meet customer requirements."

Bethlehem Enlarges Facilities For Aluminum Coating Fasteners

IMPROVED and enlarged facilities for the manufacture of Bethalume (aluminum coated) steel fasteners are being installed by Bethlehem Steel Co. at its Lebanon, Pa., plant. The plant is moving from pilot production to full scale operation on a tonnage basis with additional fluxing, rinsing, and handling equipment.

In the Bethalume coating process, a metallurgical "marriage" joins steel and aluminum in a lifetime bond for protection against corrosion. Articles to be coated are thoroughly cleaned, preheated, and fluxed in molten salt. After immersion in a bath of molten aluminum, they are spun at high speed in a centrifuge to produce clean threads. Following water quenching, they are ready for use.

Among the many applications, Bethalume steel fasteners are used in fabricating aluminum structures, such as electrical substations and transmission towers; and in securing bridge railings to concrete parapets and light standards, poles, and other structures to concrete bases. Nuts, washers, and shims also may be Bethalumed as insurance against atmospheric corrosion.

In the petroleum industry, Bethalume fasteners are advantageous for use in cracking units and other applications where extremes of exposure are encountered. They have been found ideal for assembling the equipment and holding the work in place in heating furnaces.

Enters Welding Wire Field

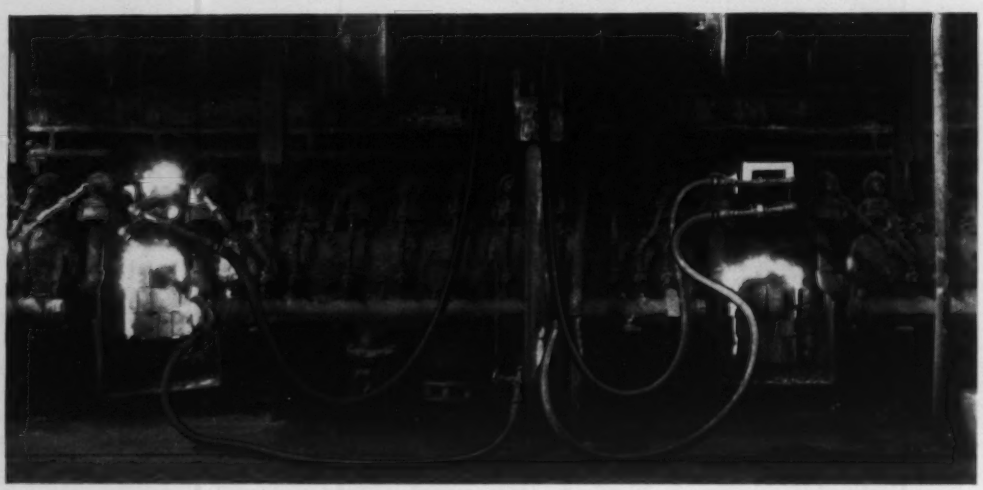
Dalweld Co. Inc., Mt. Vernon, N. Y., will start producing aluminum welding wire. Facilities include straightening and cutting machines, precision level layer winding machines, and triple degreasing tanks. Dalweld is a supplier of brazing alloys to original equipment manufacturers.

Builds Refractories Plant

Kaiser Refractories Div., Kaiser Aluminum & Chemical Corp., Oakland, Calif., will construct facilities adjacent to its Moss Landing, Calif., sea water, periclase plant for the development of advanced refractories. Cost $1,625,000. The project will be an extension of the division's basic refractories research

(*Please turn to Page* 130)

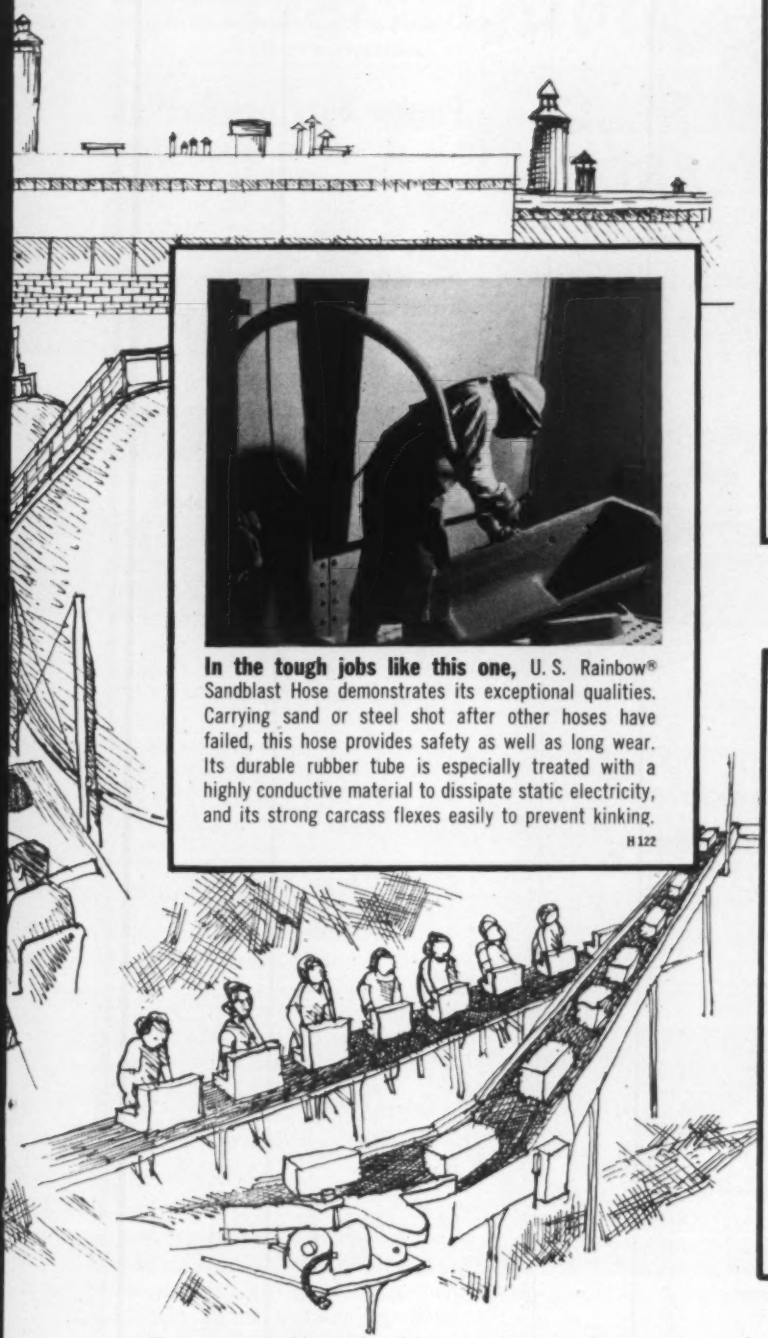
US AT THE HEART OF INDUSTRY...



Kaiser Steel depends on U. S. Peerless® Water Hose to prevent costly pipe skid burn at its Fontana, California, mill. This premium-quality general-purpose water hose, here carrying both cooling and heated return water, has demonstrated its superior resistance to age, abrasion, heat, and pressure in applications throughout the entire metal working industry.

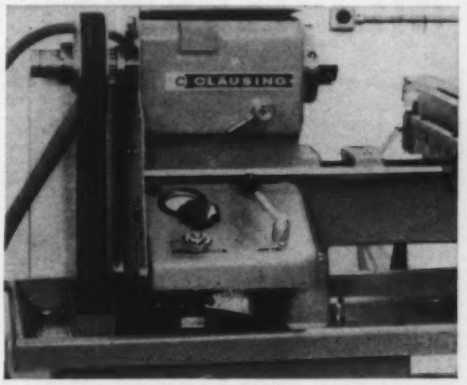
H 123

In the production of steel products, from furnace to fabrication, US Industrial Rubber Products have long been known for the efficiency and reduction in costs they make possible. As the world's largest producer of Industrial Rubber Products, US keeps constantly abreast of industry's needs.



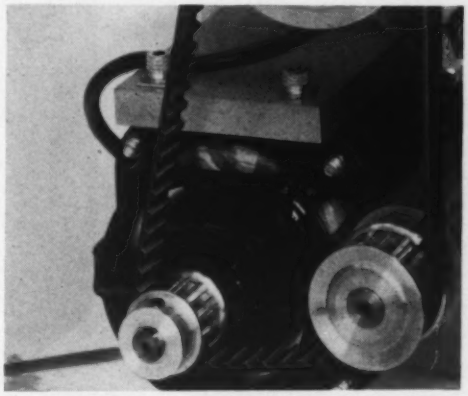
In the tough jobs like this one, U. S. Rainbow® Sandblast Hose demonstrates its exceptional qualities. Carrying sand or steel shot after other hoses have failed, this hose provides safety as well as long wear. Its durable rubber tube is especially treated with a highly conductive material to dissipate static electricity, and its strong carcass flexes easily to prevent kinking.

H 122



The abuse of continual starting and stopping was no problem for the U.S. Royal V-Belts used on this Clausing semi-automatic boring and turning lathe. These belts were selected because they ran cool, took little space, were exceptionally high in power-transmission efficiency. They proved to be the most uniform and smoothest running of many belts tested.

VB 105



One of the first users of U.S. PowerGrip "Timing"® Belts, Litton Industries now uses thousands of them to drive separate tape-drive assemblies on sensitive punched-tape recorders. These belts insure quietness, accuracy, and simplicity . . . all at low cost . . . and allow operators to change shaft rotation speeds by simply changing the belt sprocket.

TB 104

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

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OF INDUSTRIAL RUBBER PRODUCTS

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EXOTHERMIC SIDEBOARDS

"produce sound fully killed steel . . . in line with ladle analysis of the heat."

". . . ultrasonic tests show complete ingot soundness . . . macro-etch tests show good quality . . . chemical analysis of the ingots are in line with ladle analysis of the heats."

A trial run in your plant will prove beyond question, you'll get sound steel and MORE OF IT with Soffel's Exothermic Sideboards.

Phone NAtional 5-1571

PRODUCT ADVANTAGES

- **Eliminate permanent and conventional hot tops.**
- **Easy, and single, stripping of Big End Down molds.**
- **Sideboards are easily placed in head of mold by one man — crane only necessary on very large ingots.**
- **Longer mold life — less mold cost — less mold inventory to carry.**

Soffel's Exothermic Sideboards increase ingot yield, assure top cut soundness and provide more ton steel out the door per ton of steel in the ingot.

Pittsburgh Metals Purifying Co.

MARS, PENNSYLVANIA

(*Concluded from Page* 127)

program and will have the capacity to produce commercial quantities of newly developed refractories to laboratory standards.

Prosser Buys Aer-Western

A. O. Smith Corp., Milwaukee, sold its Aero-Western Div., Anaheim, Calif., to Prosser Industries Inc., a newly formed company. A. H. Prosser is president of the firm which will continue to make hydraulic, pneumatic, and pyrotechnic devices for aircraft and missile industries; damage control pumps for the U. S. Navy; and a line of submersibile pumps for commercial use.

Dallas Plant Purchased

Electro Consolidated Corp., Chicago, purchased a second plant in Dallas, doubling its manufacturing facilities. Electro took over, fully equipped and ready to operate, the lighting fixture plant of Lighting Dynamics Inc. The new 40,000 sq ft plant will operate as an auxiliary to the 43,000 sq ft plant now operated by Electro Lighting Southern Inc., the Dallas division of Electro Consolidated.

Scrap Firm Changes Hands

Business activities previously conducted by the Scrap Iron & Steel Div., Joseph Behr & Sons Inc., Rockford, Ill., have been assumed by Behr Iron & Steel Corp. Officers of the new Rockford corporation are: President, W. M. Daniel; vice presidents, Philip Behr and Richard A. Behr; and treasurer, E. A. Ross.

Electronic Firm Expands

Latronics Corp. (formerly Shaw Instrument Corp.), Pittsburgh, will build an addition to its plant in Latrobe, Pa. The firm produces electronic devices and enclosures used in the electronic industry, and temperature measuring instruments used in iron and steel, other metallurgical operations, and in research. Semon H. Stupakoff is chairman and president; R. R. Sloan Jr., executive vice president and treasurer; B. F. Bonaker, vice president, secretary, and manager of the In-

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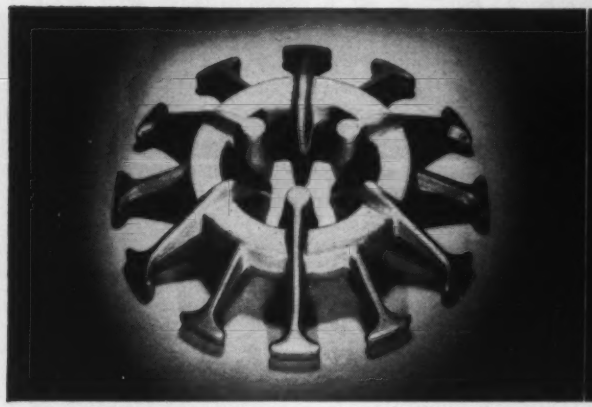


Forged, trimmed, punched, shot blasted and coined

Forged, trimmed and shot blasted

COMPLETE FORGING SERVICE FROM DESIGN TO FINISHED PART

METALS

Ferrous Metals
- Carbon Steels
- Alloy Steels
- Stainless Steels

Non Ferrous Metals
- Aluminum Alloys
- Brass
- Bronze
- Copper
- Monel
- Titanium

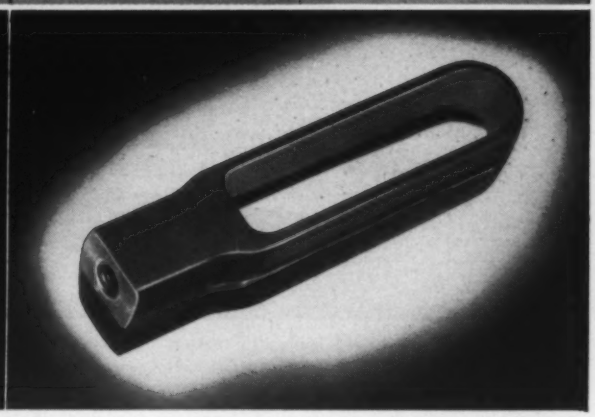
FORGING METHODS
- Drop-Hammer
- Steam Hammer
- Mechanical Press
- Upsetting
- Coining
- Restriking
- Open-Frame Hammer

CLEANING METHODS
- Pickling
- Shot Blasting
- Grit Blasting
- Tumbling

HEAT TREATMENT
- Normalizing
- Annealing
- Spheroidizing
- Hardening
- Tempering
- Stress Relieving
- Austempering
- Pack Carburizing
- Liquid Carburizing
- Solution Treating
- Precipitation Treating

FINISHING OPERATIONS
- Broaching
- Milling
- Drilling
- Tapping
- Threading
- Turning
- Coining
- Grinding, Polishing
- Chrome-Plating
- Cadmium Plating
- Black Oxidizing
- Spray Painting

Forged, trimmed, shot blasted, turned, drilled, threaded and cadmium plated



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Please send your new Forging Design Manual No. 60 which includes all necessary design data—tolerance tables, standard practices, specifications, etc.

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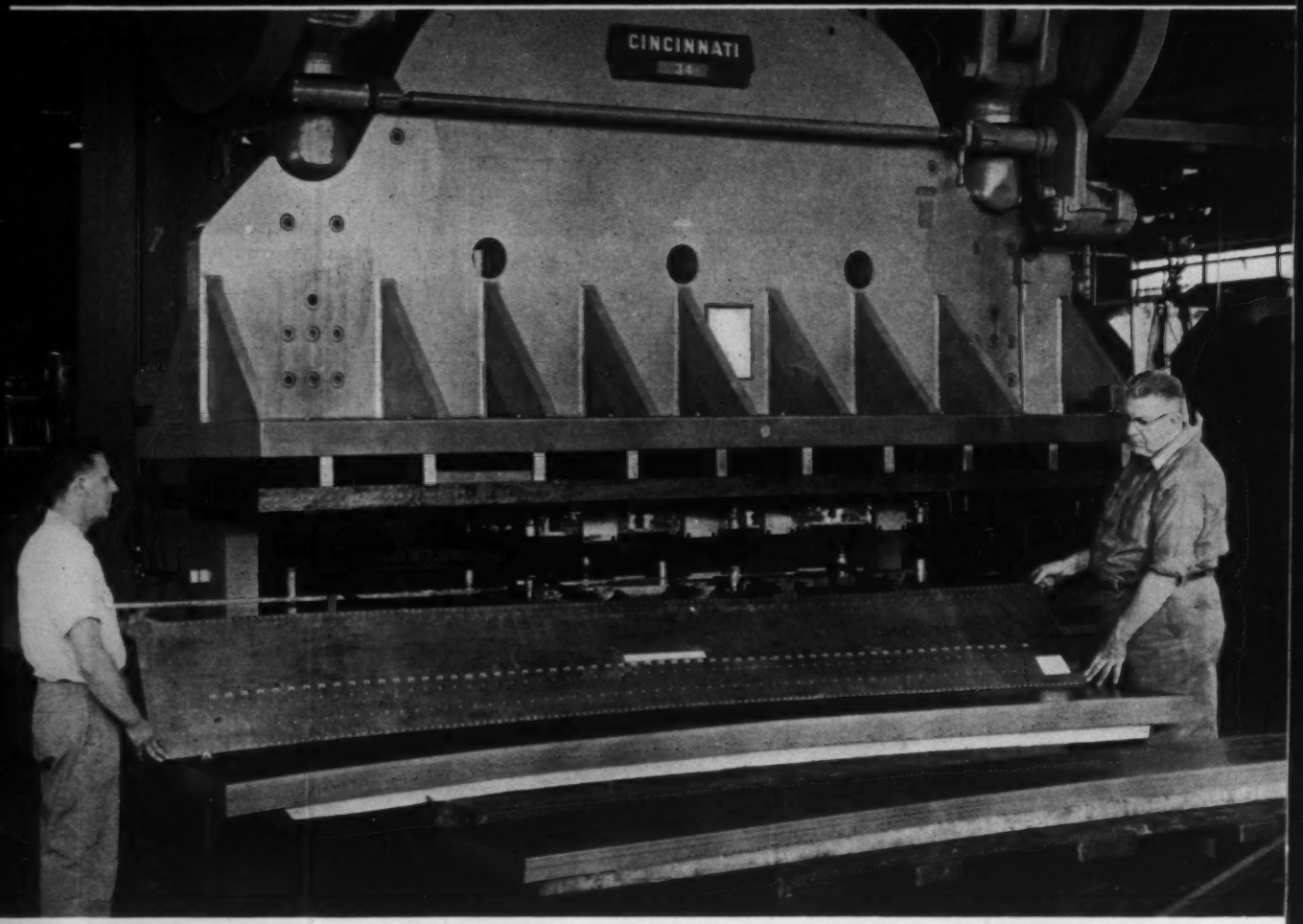
cuts press work costs



Courtesy Dahlstrom Manufacturing Corporation, Jamestown, N. Y.

For half the initial cost of a conventional press with equal die area and tonnage, the Dahlstrom Manufacturing Corporation does its press work on a Cincinnati Press Brake with widened bed and ram.

Its low first cost has been followed by other savings, too. For example, setup and operation are easy and fast because the die area is out in front of the housings. Floor-to-floor time per piece is half what it was with previous production methods. Cincinnati accuracy holds .005″ tolerances between holes.

Dahlstrom uses the full versatility of the Cincinnati Press Brake for shallow draw work, blanking, notching, and punching. Ask our representative to show you how to earn similar savings in your shop.

Shapers / Shears / Press Brakes

THE **CINCINNATI SHAPER** CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

strument Div.; and J. F. Murray, vice president and manager of the Ceramic Seals Div.

Lawson in Canadian Plant

Slumps in paper cutting machinery sales at home and abroad have prompted Lawson Co., Chicago, a division of Miehle-Goss-Dexter Inc., to sign a production contract with R. McDougall Co., a division of Upton Bradeen & James Ltd., Galt, Ont. Production costs will be slashed 20 to 30 per cent by manufacturing the paper cutters across the border instead of in the U. S., says Lawson. Shift in production to Canada will not idle former Lawson work force or plant facilities, since they will be taken over for expanded domestic operations of Miehle-Goss-Dexter Inc.

Koppers Extends Research

Koppers Co. Inc., Pittsburgh, recently dedicated an $8.5 million research center at Monroeville, Pa. Now about one-third complete, the center will eventually house about 1500 scientists. It will become the company's headquarters for research and development carried on by this and eight other facilities. In addition to product research along established lines, the staff will work in areas wholly new to Koppers. Plans include study in these areas: Chemicals, plastics, steelmaking, packaging, dyestuffs, building materials, corrosion prevention, and salt water conversion.

Glidden Co. Expanding

Glidden Co., Cleveland, has appropriated more than $1 million for the expansion and modernization of its Coatings & Resins Group plants at Chicago, Atlanta, St. Louis, and Toronto, Ont.

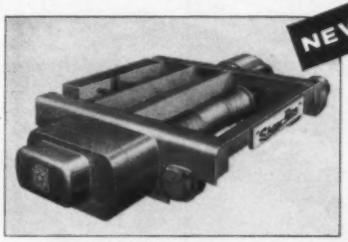
At the Atlanta plant, 16,000 sq ft of warehouse space and 6000 sq ft of office space will be added and new production equipment will be installed. In Chicago, the plant will be modernized in a project which will materially reduce the processing and handling costs of each gallon of paint. At the Toronto plant, new manufacturing equipment will be installed to cut production costs and increase ca-

(*Please turn to Page* 136)

Something New In Cranes

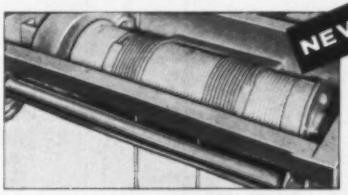
...at no extra cost!

New standards of quality and modern low headroom design are established in these Series "D" Cranes. They are built for regular industrial service — *yet have many of the advantages priced into the most expensive cranes.*



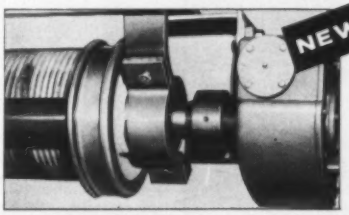
NEW **TROLLEY FRAME**

All steel, welded into a single unit and integrated with the hoisting machinery. Far stronger than the mounted monorail type of unit. Compact design provides high hook lift and close end approaches. Load and motor brakes positive acting; no back drift of hook. Trolleys available for a variety of speeds, lifts, and all standard currents.



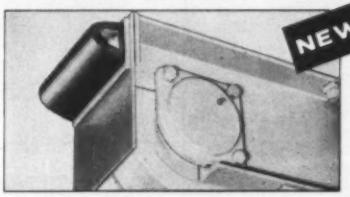
NEW **ROLLED STEEL DRUM**

A strong weldment — not a casting. Right and left hand deep-machined cable grooves provide true vertical lift at all times. No overlapping of cable on the winding drum. The drum and load sheaves have diameters at least 24 times the hoist rope diameter. Long cable life assured.



NEW **FLAME HARDENED WHEELS**

. . . on trolley *and* bridge are made of forged steel. All wheels are double flanged, with treads and flanges flame hardened to 550-600 Brinnel — nearly as hard as tool steel. Accurately machined to close tolerances, tapered bridge wheel treads assure easiest bridge movement. You can count on long wheel life.



NEW **RUBBER BUMPERS**

. . . tough, resilient. Take jolting impacts far better than wood — absorb shocks and take the strain off end trucks and bridge members. Other standard bridge features include rigid box section construction, heavy duty brake, motor and drive unit, and a checkered steel non-skid platform.

There's still more These Shaw-Box Series "D" Cranes are built in capacities from 3 to 25 tons. Models for floor and/or cab control. Spans to 80 feet. Pre-engineered components save you money and speed delivery. Write for catalog.

MAXWELL MM&M MANNING & MOORE INC. TRADE MARK

SHAW-BOX CRANES

A product of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

COLD FINISHED STEEL BARS ASSURE

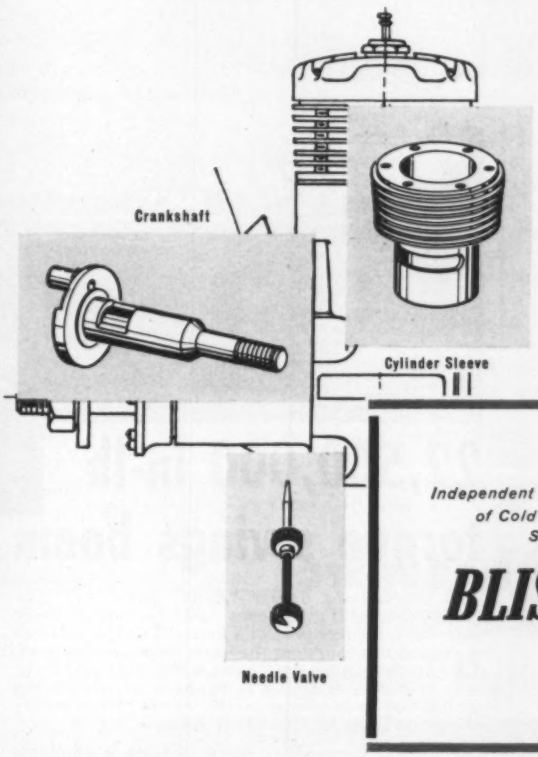
GRUELING MODEL FLYOFFS AT 125 mph

Only steel provides the stamina demanded for critical components of tiny model airplane engines. These midget powerhouses, weighing less than 8 ounces, are capable of speeds up to 125 mph during grueling flyoffs. Only cold finished steel bars can withstand that kind of field service.

For every 25,000 of these little engines, Bliss & Laughlin ships a carload of C-1213 and Ledloy A bars. Here is another example where Bliss & Laughlin furnishes precisely what is needed in strength and machinability. No more, no less. This means profitable production—whether for models or jets—because both the cost of materials *and* the cost of machining are considered.

Only cold finished steel bars are technically correct and economically sound for hundreds of thousands of applications. Check out your designs with Bliss & Laughlin. As the leading specialist in strength, finish, accuracy, straightness and machinability for 70 years, Bliss & Laughlin recommends the most suitable and economical bars from the industry's largest line of cold finished steels.

Seven mills across America, collaborating with Steel Service Centers everywhere, assure prompt, helpful, local service.



Bliss & Laughlin 1⅜" and ⅝" Ledloy A rounds are machined into complex cylinder sleeves and miniature needle valve bodies and knobs for the McCoy "35" Red Head Stunt Engine. Sleeves are black oxided for appearance and rust resistance. Tiny crankshafts are produced from 1⅛" C-1213 rounds, cyanide hardened for wear resistance and coated with molydisulphide for friction resistance.

BL-618

Leading Independent Producer of Cold Finished Steel Bars

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. MILLS: Harvey, Ill., Detroit, Cleveland, Buffalo, Mansfield, Mass., Los Angeles, Seattle

(*Concluded from Page* 133)

pacity. A new allocation for the St. Louis plant will bring completion of a modernization program launched last year—a 22,000 sq ft building for warehousing and shipping facilities will be constructed. Capacity of the plant will be increased by about 25 per cent.

American Brazing Builds

American Brazing Alloys Co. is completing a 12,000 sq ft addition to its plant in Pelham, N. Y. It will be used for flux coating and wire drawing, spooling, straightening, and cutting. The firm produces silver solders, aluminum welding wire, and special alloys.

Aircraft Plant Sold

Chicago Industrial District Inc. has purchased two parcels of the vacant Ford aircraft engine plant at 7401 S. Cicero Ave., Chicago, from the General Services Administration. Price: $3,401,500. The company plans to build a shopping center and industrial park on the site. Included in the purchase are 232 acres of the 532 acre site and 32 of some 50 buildings. The main building contains 3.4 million sq ft of floor space. Some of the smaller buildings may be demolished. The company previously purchased 38.9 acres of the site and will seek an option on the remaining acreage.

NEW ADDRESSES

Aaron Ferer & Sons Inc. moved its operations to 3248 Long Beach Ave., Los Angeles, Calif. The step will permit the firm to expand its secondary aluminum ingot output and to enlarge its facilities for the distribution of Kaiser primary aluminum ingots.

Dresser Industries Inc., Dallas, moved the Los Angeles offices of its divisions, Clark Bros. Co., and Roots-Connersville Blower Div., to 5915 E. Shelia St., Los Angeles 22, Calif.

Poole, McConigle & Dick is moving its operation to 2000 E. Columbia Way, Vancouver, Wash.,

NEWCO

Number One in *Music Spring Wire*

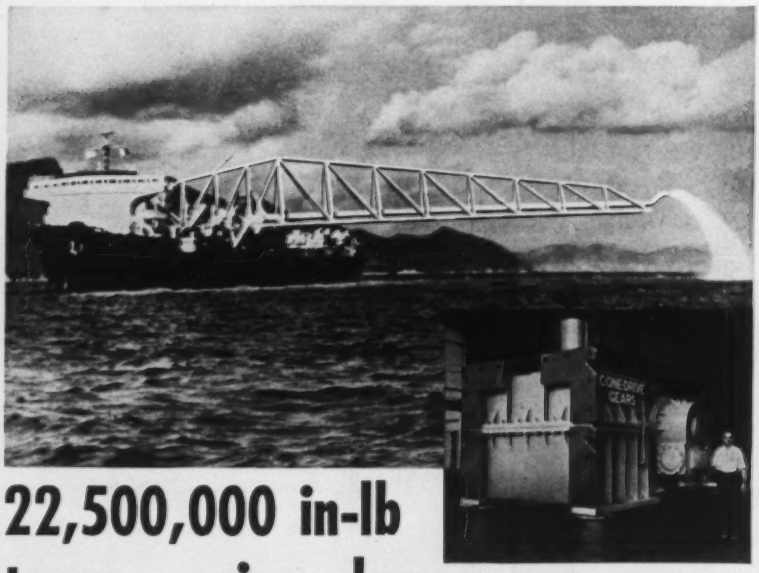
• stock list available upon request

NEWCO means quality

NEW ENGLAND HIGH CARBON WIRE CORP.

MILLBURY, MASSACHUSETTS

Offices and warehouses: Cleveland, Detroit, Los Angeles, Melrose Park (Chicago) and Millbury



22,500,000 in-lb torque swings boom

This ocean-going dredge "Zulia" has a 437' discharge boom that rotates 180° to pump waste beyond a channel project's limits. The Cone-Drive speed reducer that does the job is shown in the inset. Due to the **double-enveloping worm** gear principle, this compact housing is capable of producing 22,500,000 in-lb torque—sufficient to "stow away" the giant boom in a 75 MPH wind.

Powerful Cone-Drive worm gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

where it will carry on its steel fabrication work under the name of **Northwest Steel Fabricators Inc.** Officers include: President, H. F. Dick; vice president, D. S. Pattullo; secretary-treasurer, L. R. Regez.

CONSOLIDATIONS

Cole National Corp. (formerly National Key Co.), Cleveland, purchased **Sterling Industries Inc.**, Cleveland, producer and packager of aluminum, steel, and plastic products. S. R. Gerth will continue as president of the new Cole subsidiary.

Dominion Bridge Co. Ltd., Montreal, Que., purchased **Runnymede Steel Construction Ltd.**, Toronto, Ont., which will discontinue fabricating and erecting structural steelwork and platework, as well as the warehousing of steel products. Dominion Bridge has taken over a $3,379,500 Runnymede contract for the fabrication and construction of the Homer Bridge at St. Catherines, Ont.

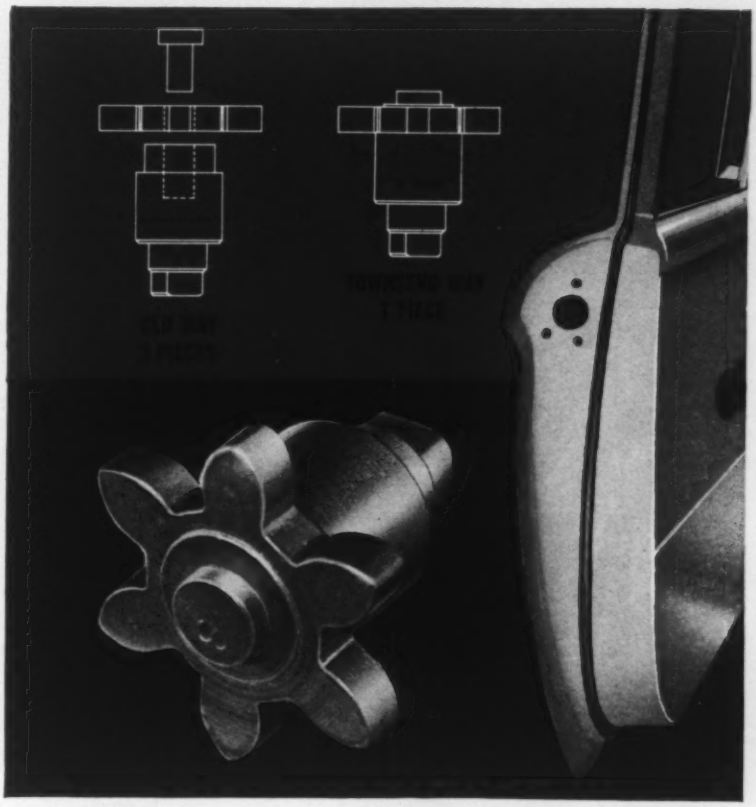
Trent & Perrin Co. Ltd., Toronto, Ont., has been acquired by **Eaton Automotive Canada Ltd.**, a subsidiary of Eaton Mfg. Co., Cleveland. Trent & Perrin makes inboard marine engines and markets in Canada the inboard-outboard marine drive developed by the Cleveland firm.

NEW PLANTS

Perfect Circle Corp., Hagerstown, Ind., opened its piston ring foundry at Rushville, Ind. The $3 million facility provides additional capacity and updates methods of producing ring castings.

G. B. S. Inc., a newly formed corporation, will occupy a 48,000 sq ft plant at 20th and Cambria Streets, Philadelphia, for the fabrication of metals and building of machinery. The building was sold by Binswanger Corp., that city.

Sparton Southwest Inc., a subsidiary of Sparton Corp., will form-



Auto maker saved $22 per thousand with Townsend Ultra-Special part

This Ultra-Special part is made by the Townsend Ultra-Special cold-forming process for $22 less per thousand pieces than the former three-piece assembly made by another method.

One of these automobile door latch rotors is used in each car door by a major manufacturer. Their annual savings—by using this part—is quite substantial.

Cold forming adds strength to make a tougher part while holding dimensional tolerances. In developing these Ultra-Special parts, Townsend's engineers combine such processes as cold-heading and impact extrusion—or, interim heat treatments and coatings. The result is an extended range of standard production equipment far beyond ordinary limitations.

You benefit directly by using Townsend Ultra-Special parts in the assembly of your products. Your increase in profit potential is a direct combat to competition. A Townsend engineer will be happy to discuss your production assembly. Write Townsend Company, P. O. Box 71-C, Ellwood City, Pa.

Townsend Company

ESTABLISHED 1816

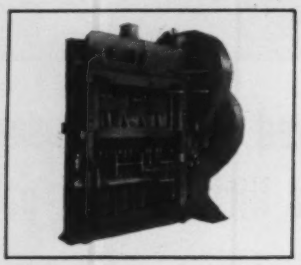
Engineered Fasteners Division

ELLWOOD CITY • PENNSYLVANIA

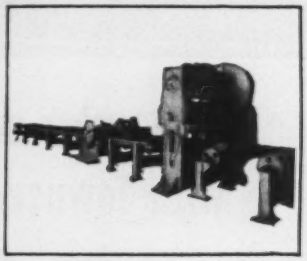
In Canada: Parmenter-Bulloch Manufacturing Co., Limited, Gananoque, Ontario

The Many Many Muscles of BEATTY

Metalworking Machinery



BEATTY GUILLOTINE BEAM PUNCH
Ideal for punching flanges, and webs of beams. Large die space, clear working space and two-point application of force affords full capacity loading and punching. 200-ton model handles beams up to 30".



BEATTY SPACING TABLE
Precise, automatic spacing of holes and slots in beams, channels, plates. In a single pass-through, one operator and one helper can complete the punching of a flange or web-section in a matter of seconds. Numerical control of carriage available.

Power, strength, speed, agility, efficiency...these are the qualities in demand when heavy metalworking is involved. And these are the properties which Beatty's machinery and equipment brings to the industry. Bending, punching, straightening, shearing, notching, pressing, and flanging . . . all are child's play for the machines of the versatile Beatty line. There is a Beatty machine to fit each of your metalworking needs; send today for free literature on Beatty punches, presses, shears, bulldozers, and other metalworking equipment.

BEATTY
MACHINE & MANUFACTURING COMPANY
100 150th St., Department 913 HAMMOND, Indiana

ally dedicate its military electronics facility at Albuquerque, N. Mex., Oct. 3. Engineering and production of high reliability printed circuitry will be performed in the 32,000 sq ft plant which will also specialize in plating with gold, silver, and rhodium.

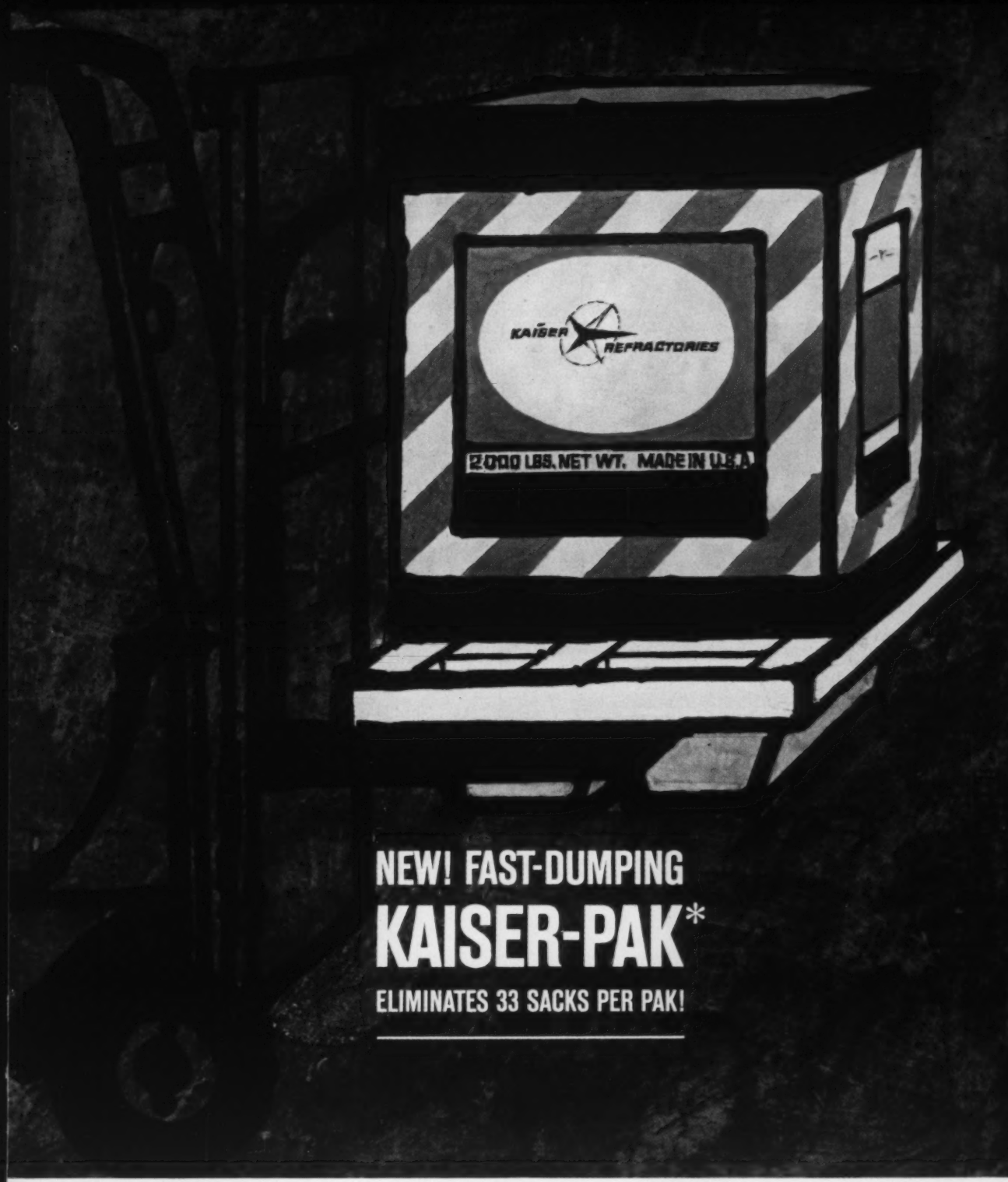
Edwards Industries Ltd. is producing stainless steel kitchen installations for commercial applications in a 8000 sq ft plant in Regina, Sask. Plant and equipment are valued at $200,000. The company is a subsidiary of Edwards Sheet Metal & Heating Ltd.

ASSOCIATIONS

A. J. Martin has been appointed assistant secretary of the **National Tool, Die & Precision Machining Association**, Cleveland. Officers include: President, H. G. Murdock; executive secretary, C. R. Bender; and assistant secretary, J. R. Stevens.

Pressed Metal Institute, Cleveland, announces election of these district chairmen: Chicago, T. E. Giblin, Argus Mfg. Co., that city; Cleveland, E. R. Voytovich, HPL Mfg. Co., that city; Michigan, L. E. Dail, Dail Steel Products Co., Lansing, Mich.; New England, D. W. Johnson, Larson Tool & Stamping Co., Attleboro, Mass.; New York, G. A. Bentley, Sheffco Mfg. Corp., Fairview, N. J.; Philadelphia, Paul Vollmar, Vamco Tool & Machine Co., East Riverton, N. J.; Toledo, Ohio, Richard Keenan, Peterson Engineering Co., that city; and Toronto, Ont., S. F. Paulin, Capital Metal Industries Ltd., that city.

American Foundrymen's Society plans to construct a $600,000 Training & Research Center adjacent to its headquarters in Des Plaines, Ill. Aim of the project is to solve three of the foundry industry's major problems: Inadequate retraining facilities in modern techniques for technical and supervisory personnel, a need for an expanded centralized training program for about 200,000 who are expected to enter the metal casting industry in the next 25 years, and lack of centralized administration and facilities for basic research.



NEW! FAST-DUMPING KAISER-PAK*

ELIMINATES 33 SACKS PER PAK!

...delivers one ton of Kaiser ramming mix or gunning grains as fast as you can pull two tabs! Kaiser-Pak is Kaiser Refractories' new palletized, moisture-proof carton. Pull one rip tab at its bottom—and a half-ton of material pours neatly between the forks of your lift. Pull the other and you've dumped a measured ton. Time: about one minute.

Each Kaiser-Pak eliminates lifting, ripping, dumping 33 sixty-pound or 20 hundred-pound sacks!

For more information about this new contribution to customer service, ask your Kaiser Refractories Sales Engineer—or write Kaiser Refractories:

OAKLAND 12, CALIF. . . . . 300 LAKESIDE DRIVE
MEXICO, MISSOURI . . . . . MEX-R-CO BUILDING
PITTSBURGH 22, PA. . . . . 3 GATEWAY CENTER

(Canadian Subsidiary: Refractories Engineering & Supplies, Ltd.)

KAISER REFRACTORIES

*T. M. KAISER ALUMINUM & CHEMICAL CORPORATION

Built on Glidden experience...

FINISHES THAT HELP KEEP YOUR CUSTOMERS SATISFIED

All too often the finish on an appliance goes sour years before the mechanism needs attention. And is a daily eyesore to the user.

By using Glidden Technical Services, you will get the right finish for the use-conditions your appliance or other metal product will meet. And your customer will get a unit that goes on looking as good as it operates . . . and stays good-looking years longer.

Total reliability of the Glidden finish is matched to product mechanical total reliability.

Glidden experience in resin technology and paint chemistry produces the just-right finish required for your product and adaptable to your equipment.

The complete line of Glidden solvent and water-reducible finishing systems includes alkyds, acrylics, epoxys . . . all resin types.

Bring your finishes problems to Glidden, by letter or by phone.

QUALITY Glidden PRODUCTS

THE GLIDDEN COMPANY

COATINGS AND RESINS DIVISION

900 Union Commerce Building • Cleveland 14, Ohio

In Canada: The Glidden Company, Ltd., Toronto, Ontario

X-RAY MOVIES— Pulsed x-rays makes it possible to study totally enclosed parts in motion at MB Electronics Div. of Textron Electronics Inc., New Haven, Conn. Pulsing also improves cooling of components and permits large increases in power needed to penetrate test specimens. (The system was devised by Zenith.)

MINING QUALITY UP—Continuous x-ray analysis of materials like ore may soon permit a kind of on-line process control for mines, states R. G. Edholm, manager, industrial product planning, Milwaukee, General Electric Co. The procedure will have particular value in trend analysis, he says.

EXTRUSIONS IMPROVED—Stainless steel tubes are now extruded with a variety of interior and exterior configurations, states H. M. Harper Co., Morton Grove, Ill. They'll be used for nut blanks, connecting rods, impellers, shafting.

TITANIUM RESISTS TINNING— To prevent erosion and deterioration, titanium might be an excellent substitute for cast iron or steel in handling molten tin, solder, or bearing metal, or for the moving parts of hot dip tinning machines, claims the Tin Research Institute, Greenford, Middlesex, England. Another idea: Nonwetting, grease pot rollers in tin plate machines.

ALUMINUM CAN TAKE IT— In a few years, aluminum should become the accepted construction metal for off-highway trucks employed in open pit mining, road building, and similar industries, believes R. A. Esmonde, sales development engineer, Aluminum Co. of Canada Ltd. He told an SAE audience that savings in operating costs under those of an equivalent steel truck could run $10,140 over a 21 month period.

MINING EQUIPMENT TREND— Engineers are paying more attention to newer modifications in heat treatment and composition of highly hardenable, low alloy steels; austenitic, manganese steels; alloyed irons; and corrosion resistant alloys. Purpose: To cut maintenance and replacement costs for underground equipment, states W. R. Barber Jr., manager, Metallurgical Dept., Esco Corp., Portland, Oreg.

H-IRON MORE PRACTICAL?—Participants at the Metal Mining & Industrial Minerals Convention, Seattle, were told that H-Iron might be an ideal and economical way to prepare charging material for the electric furnace. Officials of Hydrocarbon Research Inc., New York, quoted these figures for a 500 ton per day plant: Cost, $7.5 million (based on $15.60 per gross ton of ore containing 64 per cent iron); total manufacturing cost, $33.31 per ton of iron.

ALUMINUM SPONGES— An experimental foundry process permits production of spongelike, cellular aluminum. It's useful for filter elements, muffler fillers, bearing materials, and sandwich cores, says L. Polonsky, Pitman-Dunn Laboratories Group, Frankford Arsenal. Details are contained in PB 161,700 issued by the Office of Technical Services, Department of Commerce, Washington ($1.75).

GOLD METALLIZING SOLVES PROBLEM— Thin films of gold on the inside of bladder-type fuel systems may solve a problem of containing high efficiency fuels in missiles and rockets. Such coatings reduce permeability of Teflon 10 to 1000 times, state Joclin Mfg. Co. and Quantum Inc., Wallingford, Conn.

IMPROVE HEAT MEASUREMENT—A new pyrometer developed by the National Bureau of Standards, Washington, enables calibrations of heat measuring devices to be nearly 15 times more accurate than existing optical methods. Precision: 0.02° C at 1063° C (1945° F).

BUTTON SIZED TV?—A Japanese publication talks about work in "molectronics" that could result in "radios and TVs the size of a button." Japanese firms plan to increase production of electronic products by 60 per cent by 1964.

Is Your Heat Processing Out of Date?

• **HOW FAMILIAR are you with the heat processing equipment in your plant? If you are like many U. S. users, you will find that some of it is old, some quite old; you might even have an industrial museum specimen. Does this mean that it should be discarded or replaced? Not necessarily.**

The information in this article can help you decide. It's based on a STEEL survey and reports of members of the Industrial Heating Equipment Association. Industrial heating equipment is built to last; if your requirements are not too tough, that antique in the backroom may do all you need—and after all, it's been written off! But for many of today's high production, high precision, high quality requirements, you might be dollars ahead to learn about recent developments.

• **Industry has a $1.8 billion stake in its heat processing equipment, but a substantial percentage of the units is more than ten years old.**

The STEEL survey (see chart) checked the age of the equipment used in five major metalworking categories, representing nearly 80 per cent of all metalworking. Apparently, while ten years is old for a car or an appliance, it is about average for heat processing equipment. Exceptions are induction and dielectric heating units, but this is not startling for a segment of the industry that is only about 25 years old.

Value of the equipment installed varied with the type of industry more sharply than the age of the units. S.I.C. 33 (primary metals) indicated 77.7 per cent of the responding plants having heat processing equipment had $100,000 or more tied up; S.I.C. 34 (fabricated metals) had only 16.7 per cent in this bracket, and were more likely to have between $10,000 and $50,000 (46.5 per cent). Total value of the equipment at work today is about $1.8 billion; original purchase price or replacement value would

Survey Shows Age of Heating Equipment

S.I.C.	Definition	YEARS	OVENS 0-4	OVENS 5-9	OVENS 10-19	OVENS 20+	INDUCTION OR DIELECTRIC 0-4	INDUCTION OR DIELECTRIC 5-9	INDUCTION OR DIELECTRIC 10-19	INDUCTION OR DIELECTRIC 20+	FURNACES—ELECTRIC 0-4	FURNACES—ELECTRIC 5-9	FURNACES—ELECTRIC 10-19	FURNACES—ELECTRIC 20+
33	Primary Metals		26	26	**35**	**13**	36	45	**13**	**6**	15	22	**49**	**15**
34	Fabricated Metal Products		27	31	**37**	**6**	33	29	**20**	**18**	31	39	**28**	**1**
35	Machinery (except Electrical)		27	31	**33**	**8**	24	45	**31**	**1**	12	40	**39**	**9**
36	Electrical Machinery		39	30	**24**	**7**	64	15	**21**	..	82	8	**10**	**1**
37	Transportation Equipment		23	43	**24**	**10**	37	47	**14**	**2**	15	40	**41**	**6**

be at least double that.

Although the total purchases of heat processing equipment in 1960, around $300 million, were more than enough to cover depreciation losses, the plants responding to STEEL's survey were not making wholesale plans to replace their equipment. Of those plants with some units now installed, 59.5 per cent thought they would not make any additions by the end of 1961; 27 per cent thought they might, and 13.5 per cent said they had definite plans for additions to their furnace or oven equipment. By S.I.C. groups, here is what they told STEEL:

	PERCENTAGE OF PLANTS PLANNING—		
S.I.C.	Additional Heat Processing Equipment Installations	Probable Additions— But not Definite	No Additions
33	25.0%	36.1%	38.9%
34	10.3%	18.8%	70.9%
35	7.7%	28.2%	64.1%
36	21.6%	20.3%	58.1%
37	19.6%	36.1%	44.3%
Over-all Heat Processing Industry	13.5%	27.0%	59.5%

• Changing patterns in equipment use are pointed out by the survey.

Fuel fired furnace units will more than hold their own, with the cost and availability of natural gas spurring the interest, if STEEL's respondents follow through as they expect.

Induction and dielectric units, along with ovens, will maintain their share of user purchases; electric equipment will trail the others since very large units are usually fuel fired.

Electrically heated units glow brightest in some of the specialty applications—vacuum furnaces, ultrahigh temperature units, some of the large gantry units. Probably many plants will be upgrading their present equipment; they plan to buy associated units, such as atmosphere generators.

• Developments in combustion equipment offer rapid heating, concentrated heat sources, and more efficient use of fuels. The associated equipment, such as mixers, controls, and safety devices, offers higher reliability and greater ease of maintenance for continued satisfactory operation.

A radiant cone gas burner, with high radiant heat transfer sweeps the combustion gases across the surface of the refractory cone. The circulation pattern shortens the flame front and gives controlled combustion within each burner by pulling the hot gases in toward the center of the cone itself. The refractory cone is superheated, yet work can be brought close to the burner without fear of burning it; that cuts radiation losses.

Another type of burner directs the combustion products at right angles to the center line. It is called a flat flame burner and makes use of the surrounding refractory material as well as the burner surface itself. Since the flame is held close to the furnace walls, loads can be placed closer to the burner area without danger of overheating and additional burners can be placed in existing furnaces for higher heat rates without the problem of flame impingement on the load. The device permits better temperature uniformity and faster heat transfer than had been possible in earlier designs.

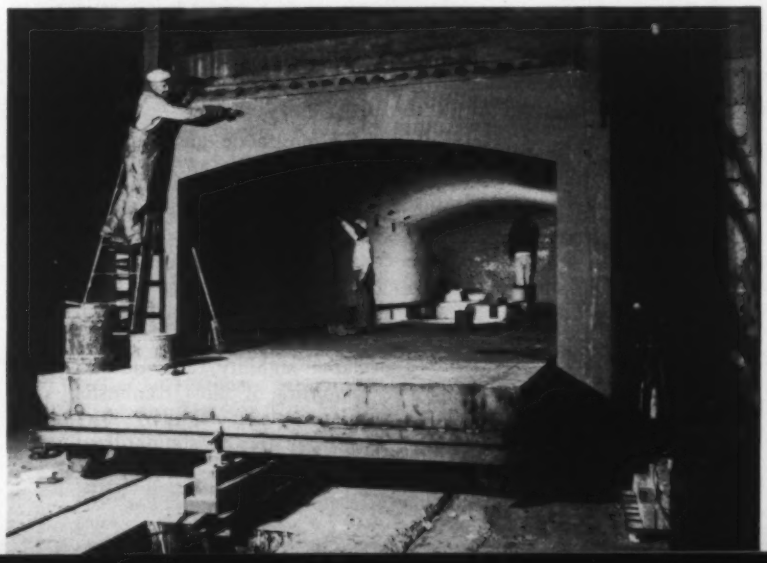
A combustion development, high heat release rate combustion, involves burning a conventional fuel with air, at atmospheric pressure, and at a rate of at least 1 million Btu an hour per cubic foot of combustion volume. That high rate of heat release can be accomplished even with slow burning fuels such as Bunker C or residual oils; with faster burning fuels such as gas and distillate type oils higher release rates (up to 10 million Btu an hour per cubic foot) can be obtained in industrial type burners. This new class of process heating equipment offers smaller physical size or its equivalent, higher heating capacity. The same type of unit will provide very high flame temperatures with little or no excess combustion air. For some heating needs, air preheating or oxygen enrichment can be eliminated. Complete combustion is important for direct drying, where contamination would be a problem.

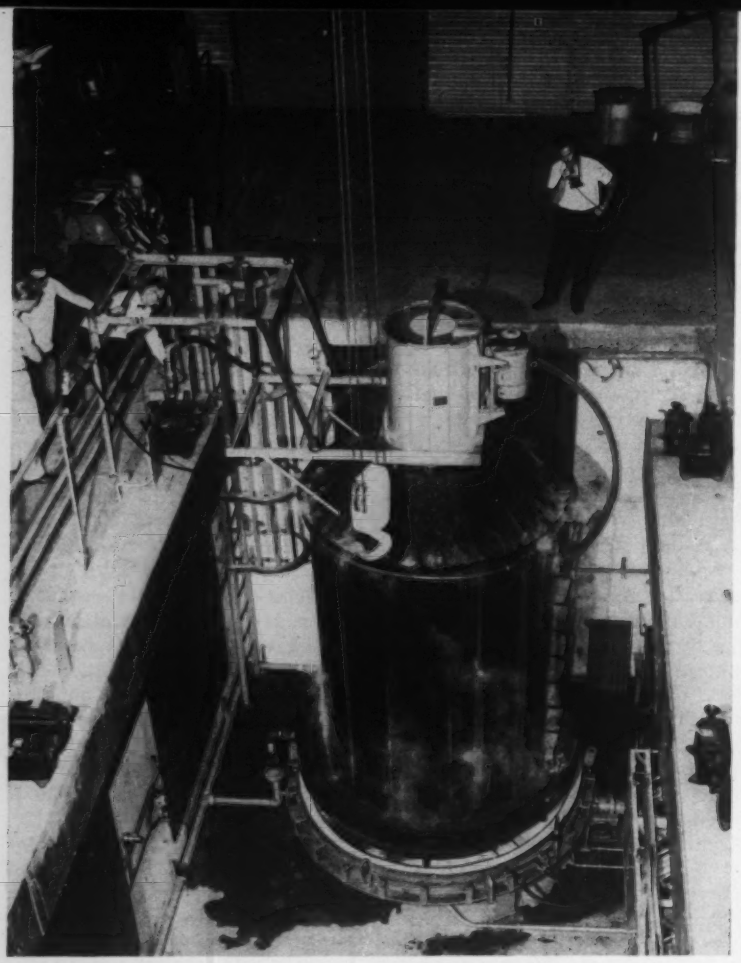
The tighter requirement for industrial equipment, resulting from automated units and the higher cost of plant size, was one of the factors speeding improvement in burner and control equipment. Equipment makers have developed completely packaged combustion assemblies to eliminate misalignment and assure satisfactory operation.

Radiant tube heating, involving combustion within a ceramic or metal tube to prevent products of combustion from entering the furnace atmosphere, has resulted in burners specially designed for the

FURNACES—FUEL FIRED			
0-4	5-9	10-19	20+
24	23	**28**	**26**
10	30	**32**	**27**
16	30	**43**	**11**
21	32	**36**	**11**
16	23	**43**	**19**

Large furnaces are field erected . . .





Vertical furnaces and cooling units provide controlled atmosphere processing for missile and rocket cases

purpose. They stretch the burner flame to a considerable length of the tube using longer hence more efficient and economical tubes.

A spiral flame burner is another design effective in keeping the flame along the wall surface rather than in the heating area.

Gas has been used for infrared heating; the design employed permits ganging of the burner units to provide large radiant areas with temperatures controlled over a wide range. The use of such burner assemblies permits controlled heating patterns for rapid baking or drying.

Burner pilot systems have been developed which compensate for varying draft conditions, and simple mixer designs provide a wide range of fuel output, with a limited number of mixer sizes.

Heat release in the new radiant heat burners averages about 30,000 Btu per square foot, and the designs permit the heat release intensity pattern to be contoured to the heating job.

Equipment has been developed for high temperature, high pressure, high velocity air for operations such as brazing, soldering, shrink fitting, and annealing of many materials. Heat up to 1800° F can be "piped" into locations otherwise inaccessible by using a compact unit, and close control of temperatures can be obtained.

Atmospheric gas burners, which do not require an air blower, have become larger in size, permitting greater heat inputs. The simplicity of such installations makes them attractive to many users. With new burner holders and accessory mountings, refractory burner tiles are no longer needed to maintain flame stability. In addition, the mounting of pilots, combustion safeguards, and similar devices is easier with the standardized units. With atmospheric burners, burner size is the same for the various types of gas supplies which can be used.

The increased use of protective atmospheres has tightened the requirements for the equipment used in producing them. At the same time, new flow meters can tell the operator how much gas he is using, and the proportion of two gases where a blend is employed. New units can be more readily cleaned, to assure accuracy of the readings. Combined with the meter may be a flow control valve so the operator can see and adjust the flow at the same point. Ease of cleaning is also a feature of new mixers for gas and air which are used for exothermic and endothermic generators as well as for combustion.

Combustion equipment makers have also been concerned with the design of the equipment in which their units have been used. One development has been a five zone, slab heating furnace which permits a 25 per cent increase in heating capacity, regardless of the material thickness. That is particularly important in the larger slabs required for heavier coils being rolled for customers. Thus, in a triple fired furnace, it is reported that 11 in. thick steel slabs can be heated at the rate of 120 lb per square foot per hour; in the five zone furnace, 150 lb per square foot per hour can be heated without danger of overheating. A cost cutting development has been the use of an insulated or refractory covered skid. The skids, commonly water cooled, are a source of heat loss and the use of refractory insulation is less costly than the addition of a recuperator to the furnace design.

Burner equipment is also used for direct gas fired heating of plant air. One of the reasons is the exhaust systems connected to grinders, spray booths, washers, arcwelding booths and similar equipment. If adequate makeup air is not provided, the plant is under negative pressure which causes erratic performance of burners, drafts, and the improper operation of doors and door closers. The burners are designed to promote complete gas combustion, and the combustion products are highly diluted in the incoming air. Since all the heat is released into the air intake, efficient utilization

of the fuel is obtained and larger quantities of air can be heated economically.

• Improvements in furnace equipment have been primarily a matter of evolution. While the fundamental heating processes, for such things as soaking pits, rotary hearths, and standard heat treating furnaces, have not changed, there have been many refinements in the furnace design aimed at reducing production costs. These include better refractories, improved burner designs, better furnace design, greater heat recovery through recuperation and improved equipment for handling work in, through and out of the furnace.

Requirements have also been changed by a trend in steel producing companies to supply steel to required physicals obtained by heat treatment. Furnaces for such applications must handle the mill tonnages required.

High production rotary hearth furnaces have been used in the copper industry for the preheating of copper cathodes prior to melting in the electric furnaces. They serve a dual purpose. They reduce electric power requirements, and at the same time, eliminate the possibility of splashing by water going into a melt.

Closed circuit television has been used for quality control and visual inspection of the furnace areas, permitting the operator to observe otherwise inaccessible portions of the furnace or to watch both ends at the same time. Improvements in refractories and alloys have aided in giving the designs more leeway.

Soaking pits for the steel industry may now be supplied with metallic recuperators which permit more accurate control of fuel-air ratio for better efficiency. Higher air pressures on the burners permit better control over heat distribution, particularly valuable as the sizes of soaking pits increase. Modern controls may make the functioning of these pits almost automatic, and new mechanisms permit more careful sealing for better heat distribution.

Tighter requirements on controlled atmosphere equipment have led to new designs and improvements on older ones. A package type, small capacity, hydrogen generator has been developed. It depends on the reaction of steam with fuel. It is

Heating Equipment Business Cyclical

H. J. PUGSLEY
President
Industrial Heating Equipment Assn.

THE U. S. industrial heating equipment industry, composed of about 250 manufacturing and engineering firms, builds furnaces, ovens, induction and dielectric heaters, and combustion equipment. It also produces related items, such as atmosphere generating equipment, but does not include domestic or industrial comfort heating units.

The 1958 Census of Manufactures, containing the most recent data available, says the industry employs a total of 9246 persons and pays total wages of $51,256,000. Production workers number 4751, are paid $22,832,000.

Industry shipments in 1960 amounted to $300 million. As metalworking sales go, that is not large, but the equipment goes to all parts of the metalworking industry, and it is hard to imagine producing or working metals without the application of heat.

Of the 250 companies making up the industry, 203, or 81 per cent, are considered as small business establishments, having less than 500 employees.

As a capital goods industry, the industrial heating equipment industry sales are highly cyclical. Heating equipment, designed to last for years, is not often replaced during periods of slow or uncertain business unless it becomes incapable of doing the job. And delivery times lengthen as business improves and companies reactivate their modernization plans.

Many economists consider this industry to be a good barometer of the business climate. Industry swings are greater than those of the industrial average. Since 1955, sales (in millions) have been:

1955	**$208**	1959	**$236**
1956	**258**	1960	**301**
1957	**308**	1961	**315***
1958	**239**	*Estimated.	

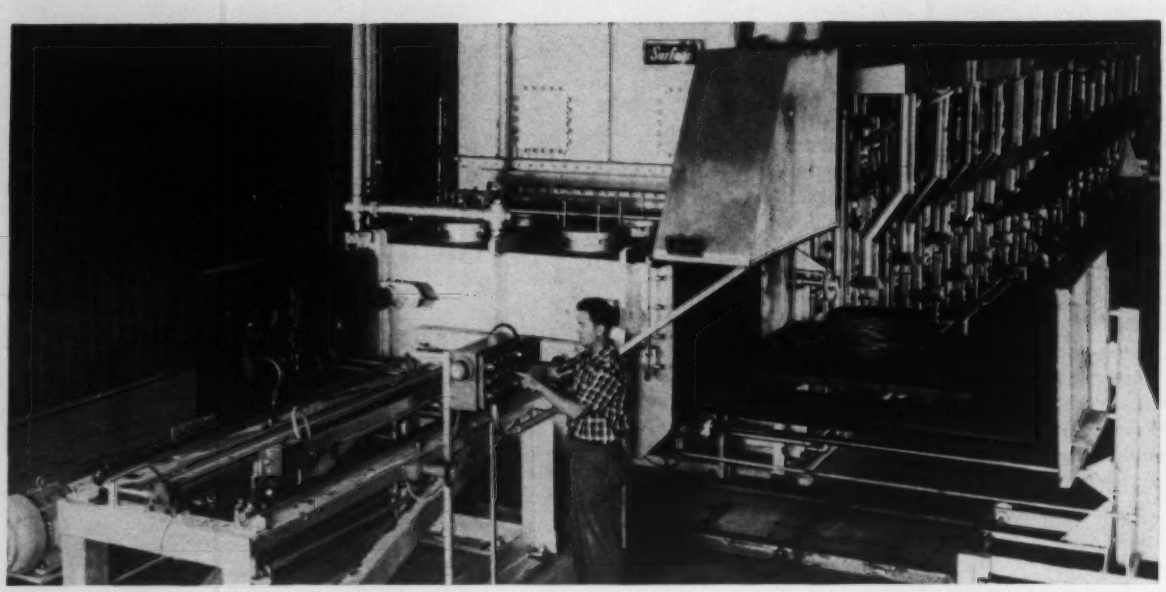
The heating equipment companies expect that business for the last half of 1961 will exceed both the last half of 1960 and the first half of 1961. The industry may be an exception in that it has an increasing amount of foreign business. Members of the Industrial Heating Equipment Association report that foreign sales for the first half of 1961 are double those of the corresponding 1960 period.

Metal producing industries are the largest purchasers of industrial heating equipment. The steel industry is responsible for about half of the total value of heating equipment purchased, although it buys considerably less than half of the number of units sold.

Furnaces and similar equipment are sold either factory built or, for larger units, field erected. In 1960, factory built equipment accounted for $183 million of shipments, field erected units $117 million. Industry sales figures show a growing share going to fuel fired equipment.

About 3500 engineers are necessary in the 250 companies because a builder rarely receives an order for more than one unit of a given type and size. Equipment, designed to the user's specifications, cannot be made in multiple lots or stored for off the shelf delivery.

The Industrial Heating Equipment Association, comprising many prominent manufacturers, is one of the stronger capital equipment trade groups, and was founded in 1929. Headquarters are in Washington. Robert E. Fleming is executive vice president.



This fuel fired, tray type, pusher furnace permits atmosphere control for carbon restoration during annealing of steel wire coils

a small brother to the large units employed by the process industry. Other units for hydrogen production depend upon dissociation of ammonia, separating the hydrogen from the nitrogen.

A combustion type atmosphere generator combines the gases produced by an exothermic and an endothermic type. It can produce a wide range of gas compositions at a low dew point. Such atmosphere control units, and the new furnaces, are important for carburizing and for carbon restoration to assure uniform carbon content in the steel.

Batch furnaces have been automated and applied for carburizing or case hardening of steel parts. They are self-contained units, complete with quenching facilities.

In the salt bath field, design improvements have permitted substitution of nickelfree materials for high nickel cast or raw products in electrodes for neutral hardening and high speed, tool steel hardening. Proper protection of the electrode bars at the air-salt line has resulted in service life several times longer than had previously been obtained. In molten salt units for martempering and austempering, reversible high volume, low pressure salt pumps and header systems have been developed. Separation of the chloride salt, often used for austenitizing, is made a part of the furnace system and the quenching power of the salt can be controlled by small additions of water to the nitrate-nitrite bath. Simpler conveyor systems are used.

Temperature uniformity is essential in producing semiconductors where gaseous and solid diffusion, alloying, zone purification, and crystal growing are involved.

Production of rockets and missiles has required the development of furnaces to heat treat large cylindrical assemblies up to 80 in. in diameter and up to 24 ft long with a wall thickness of around 0.100 in. The work must be heated rapidly and uniformly, and be free from decarburization or carburization with a minimum amount of distortion. The thin section requires rapid quenching, and consequently the furnaces are designed to load and quench from the bottom directly into atmosphere or into hot salt. Automatic carbon potential control, based on the dew point of the endothermic atmosphere, is provided.

Among the newer pieces of equipment is the cold wall, vacuum furnace which has been built for temperatures up to the 4000 to 4500° F range. Those temperatures are not possible with externally heated metallic muffles so the furnaces are constructed with a series of radiation baffles inside their water jacketed shells. Heating elements are mounted inside the inner baffle. They're made of tungsten, molybdenum, or tantalum. The vacuum furnace may be provided with means of moving work from a hot zone to a cooling zone, or the cooling cycle may be accelerated by back filling with an inert gas.

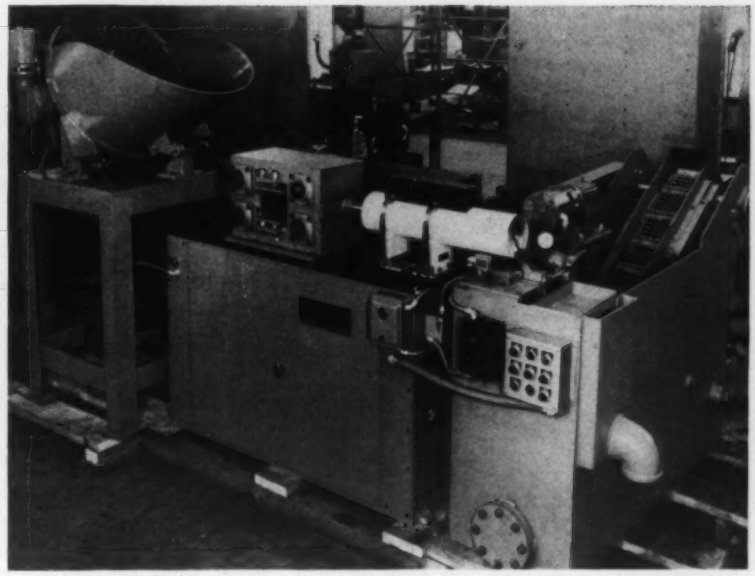
Large furnaces for producing fully heat treated steel plates provide for heating, quenching under a load or pressure, and tempering after quenching. Facilities today handle plates up to 172 in. wide by 45 ft long. Similarly, strip is continually processed in plants which are ever increasing in size and complexity.

In the nonferrous field, forced circulation type heating has increased both production and quality of material as compared with the radiant heating furnaces previously used. The forced circulation has also made possible high production, single pass furnaces for producing annealed, scratchfree, stainless steel strip. Capacity of individual plants for the production of continuously annealed tin plate has increased from 8 tons per hour at 325 ft per minute to 30 to 60 tons per hour at 1000 or even 2000 ft per minute.

Stainless steel strip can be handled in widths up to 48 in., and a refractory lined furnace produces bright annealed stainless steel strip using molybdenum elements.

The open coil annealing system,

Induction heating for brazing carbide tips



This mechanized unit hardens parts automatically from the time they are dumped into the feed hopper until they are delivered, completely treated

permitting more uniformity and more rapid heating of coils of steel has also been used for composition control by varying the furnace atmosphere.

• On induction and dielectric heating units, power sources, controls, and handling devices have been improved. To the user, that means more precision in heating with fewer operating problems.

Today's high frequency motor-generator sets offer reduced first cost and minimum maintenance. The driving motor is tailored to the generator requirement, efficient use of materials reduces the weight and size; improved internal cooling gives lower operating temperature, better protective devices are built in and vertical design has reduced floor space requirements.

Tube oscillators for frequencies above those of motor-generator sets were an early source of high frequency power and they have been made more rugged, more efficient, and higher powered. Larger tube oscillators have been made possible by improvements in the oscillator tubes, both 60 cycle and radio frequency transformers, better rectifying devices, built-in cooling systems and power control systems to regulate the output and input of the tubes. Better protective devices have reduced maintenance. The largest single oscillator in production today is rated at 300 kw.

The static multiplier—the device that multiplies the normal line frequency of 60 cycles to 180 cycles—has also undergone improvement and is finding its niche in the induction heating field. It has no moving parts and can be combined with other types of generators for multiple frequency heating.

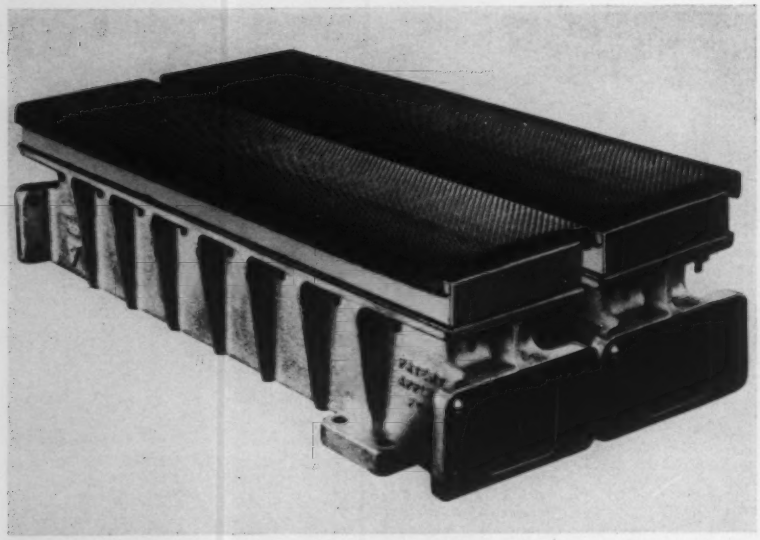
Modern handling devices are rugged, precision machine tools that can be automated. They can be made to combine operations in one unit, such as machining, heat treating, and burnishing; brazing and hardening; machining and hardening; hardening and grinding. Precision work handling devices (with or without automation) and precision control of the heated area—depth, width, location, and temperature—all combine to lower production costs and increase quality, reduce distortion to avoid subsequent straightening.

The success in service of such induction hardened automotive parts as crankshafts and camshafts led to wider use of the process on additional parts such as gears, transmission parts, bearing races, rocker arms, rocker arm shafts, track links, and track pins. An alloy steel furnace hardened steering knuckle could endure indefinitely a strain of 0.044 in. amplitude whereas an SAE 1046 knuckle which had the critical areas induction hardened had an infinite life with a strain of 0.070 in. amplitude. The cheaper steel is also easier to machine.

Gears are being induction hardened for both wear resistance and increased fatigue life, in sizes from inches to yards in diameter. All teeth on gears up to 36 in. in diameter may be hardened at one time in a matter of seconds, larger ones are hardened one tooth at a time. One manufacturer who changed from SAE 8645 to induction hardened SAE 1050 saved $82,000 in one year.

Continuous induction annealing of formed copper cable has greatly reduced the stiffness of the finished cable making it easier to handle and install. Continuous heat treatment of steel cable has increased the average physicals and made a more uniformly heat treated cable possible. Annealing of threads such as those on carburized and hardened tierod ball studs is today a routine production job with a better product at greatly reduced costs.

Induction heating for forming offers improvements in work handling equipment, gradation of heating (heating only the area required for forming), and precise power control. It is being widely used for the heating of nonferrous billets for extrusion, for heating for forging



Combining several of these gas fired, infrared heating units, you can cover larger areas

both in straight line production shops and in job forge shops, and for forming a wide range of materials—steel, brass, aluminum, titanium, and others. The continuous heating of SAE 1095 bar stock for forging rock bits gives a clean, uniform forging. The cutting of the bar stock into slugs which have to be handled, heated, then fed to an upsetter is eliminated.

The induction heating units for forging are clean, radiate no heat, and can be easily automated for the production shop. The elimination of heavy, hard scale cuts metal loss and increases die life as much as 400 per cent. Heating rivets for railroad car work is another application of induction heating for forming which saves in labor, fuel, and maintenance. Rivets of the right size are delivered to the riveter at the right time and at right temperature.

Induction heating for brazing and soldering puts the heat only in the area required. It has enabled one manufacturer to precision solder production quantities of oil filled, hermetically sealed units without disturbing the contents of the unit. Vacuum brazing of stainless steel aircraft parts is a practicality, and a precision machine tool, completely automatic with fluxing, application of brazing material, and induction heating is making appreciable saving in a brazed unit.

The application of high frequency (1 kc to 450 kc) induction heating to the continuous seamwelding of tubing and pipe has given industry a new cost saving tool. It has increased welding speeds, made possible welding of nonferrous materials, permitted use of hot rolled steel without special preparation, assumed accurate control of the upset, given greater flexibility and less maintenance. Conduit, line pipe, furniture tubing, and radio antennas are among the many types of pipe and tubing being welded with induction heating.

An induction buttwelder makes a smooth joint on pipes with $\frac{1}{8}$ to $\frac{1}{2}$ in. wall in a matter of seconds on pipe, boiler tubes, and rails. The induction buttweld leaves only a slight bulge on the ID of the pipe and requires no finishing. Low carbon steel, high carbon steel, alloy steel, and even nodular cast iron have been successfully welded. Control of power, area, sequencing, and pressure are the developments making this improvement possible. After the weld is completed, power can be reapplied for annealing.

The application of induction heating to the melting of metals is probably the earliest use of induction heating in industry. Its use for the melting of steel, copper, brass, aluminum, nickel alloys and many other materials is widespread. Two basic types of furnaces—the coreless and the core type—are used. The frequencies most widely employed are from 60 to 10,000 cycles. Inherent in the induction process is forced circulation which promotes uniform composition.

Induction vacuum melting has made possible the production of various metals and alloys which formerly were laboratory curiosities. Our atomic energy program and jet engine production depend on the material produced in vacuum, induction melting furnaces.

• Major changes in the field of industrial ovens have been improvements to meet demands for more cleanliness, automation, and ease of maintenance. They have also permitted higher temperature operation with oven type construction.

In metal preparation, equipment has been developed for more effective and rapid cleaning to permit the installation of such lines within available factory floor space. Improved heat exchangers permit more uniform temperature control and simplify cleaning operations on the equipment itself. Streamlining the outer surfaces eliminates the tendency to catch and retain the dust and dirt. Many such installations have gone to outdoor or roof top locations even in Northern areas, because of the saving in floor space.

After parts have been painted or lacquered, ovens used in the drying operation are designed to give increased drying rates with high velocity air flow. That is particularly important where work is being strip or roller coated, or with higher production rates.

Compact, portable ovens and heaters have been used to bring the heating equipment to the job, particularly for intermittent applications.

There is a growing trend toward gas rather than oil in heating ovens; such ovens have less dust.

Use of stainless steel and heat resistant alloys for oven liners has lifted their top operating temperatures well above the 1000° F which was considered maximum. Oven type units operating at 1200 or even 1400° F are in commercial use today.

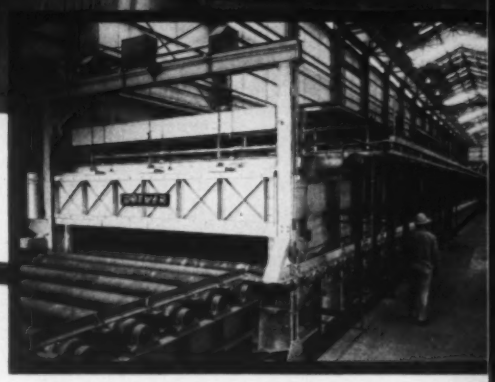
• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

ONE MAN HANDLES 16 TONS/HR. AND UP ON THIS DREVER WIDE PLATE HEAT TREATING LINE

IT'S A LONG WALK from end to end of this approximately 500′ Drever Continuous Wide Plate Heat Treating Line at the Houston plant of the Sheffield Division of Armco Steel Corporation. But, one man controls the entire processing of alloy steel plate from his air conditioned booth. He is helped by hook men at each end of the line and by an overhead crane operator, but while the plate is being treated he has complete pushbutton control combined with closed circuit television and phone intercommunication.

VERSATILE ARRANGEMENT

Designed to accommodate plate as wide as 156″, the line is rated to harden and temper plate to 32,000 lbs./hr. and above, and will normalize plate up to 50,000 lbs./hr. It consists of a hardening furnace, conveyor tables and cars, pressure quench, reversible heating tempering furnace and a side conveyor for by-passing the tempering furnace or for repassing the plate through the tempering unit. This is the second Drever Heat Treating Line at the Sheffield plant.



DREVER ENGINEERING FOR YOU

Drever engineering experience in the heat treating field ranges from the smallest batch furnace to continuous equipment for all phases of the metals industry. Whatever your heat treating requirements may be, consult with Drever Engineers. Write or phone—Drever Company, Bethayres, Pa. Wilson 7-3400.

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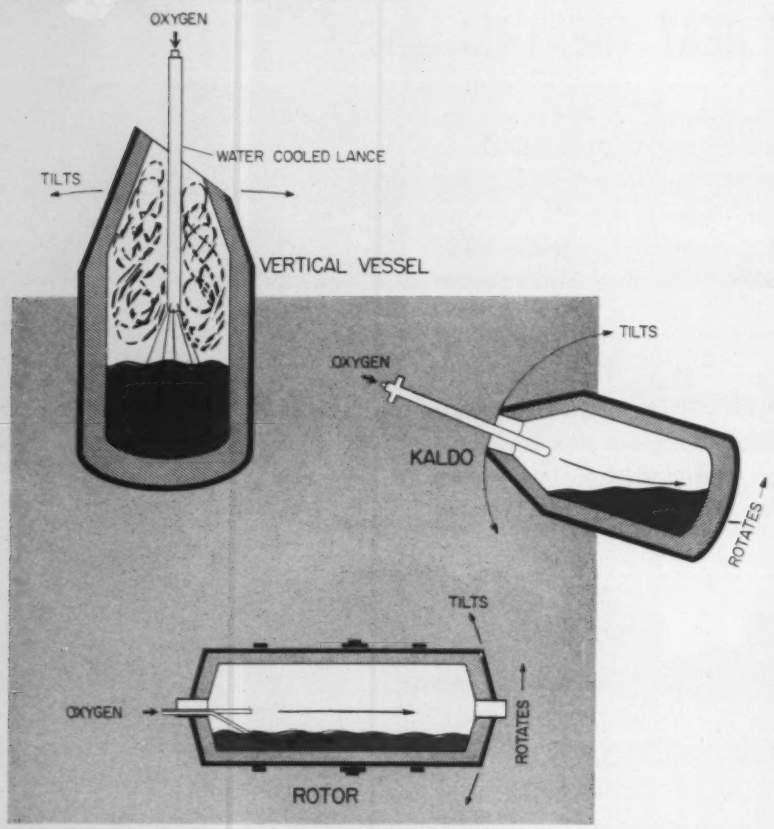
ENGINEERED TO YOUR PARTICULAR REQUIREMENTS

ENGINEERING AND MANUFACTURING FACILITIES AROUND THE WORLD THROUGH ASSOCIATES IN FRANCE, GREAT BRITAIN, GERMANY, ITALY, JAPAN AND INDIA



Choice of new equipment varies as . . .

Pneumatic Steel Processes Replace Old Open Hearths

• BASIC OXYGEN steelmaking facilities in the U. S. could account for 30 million to 35 million tons of ingots annually by 1965 (about one-fifth the total steel output expected in the nation by that time).

That is the opinion of spokesmen from large and small steel companies queried by STEEL. They were asked to comment on the popularity of oxygen processes; company plans for new melting capacity; and the pneumatic process each might choose for a capacity boost or replacement of obsolete facilities.

• The swing to pneumatic processes, pronounced in the sixties, will gain momentum in the seventies.

Two companies expect oxygen vessels to represent at least 50 per cent of their melting capacity by 1965 and more than 90 per cent by 1975. How fast that trend will grow depends on the rate obsolete open hearth shops are "phased out."

One company that isn't using basic oxygen equipment plans to install such a facility in its next expansion. Another producer is considering oxygen vessels seriously; adoption is "possible" by 1965 and "probable" by 1975.

• More predictable production schedules, promised cost savings, and lower capital requirements give oxygen processes the edge over open hearths.

Steelmen like the high yields of low sulfur, low nitrogen steel from basic oxygen vessels. They're interested in the high hourly tonnages and the regularity with which the heats are made.

They're not ignoring the disadvantages of oxygen processes, such as the narrower range of analyses and limited scrap consumption. But they are extremely interested in the modest capital requirements for a basic oxygen shop with a given annual ingot capacity. And ground area required for an oxygen vessel facility is relatively small.

Cost of operation (including labor) is said to be far lower for the oxygen processes than for open hearth facilities of the same capacity.

The need to modernize obsolete facilities is cited by most steel companies as the prime reason for a changeover to pneumatic processes. Abandonment of operable open hearth facilities and adoption of an oxygen process would be likely only if substantial savings in production costs made rapid amortization possible.

Payout time for an oxygen process melt shop (determined by savings in production costs per ton and the number of tons produced annually) would be a vital factor in deciding whether to go pneumatic. Some steel companies say a payout time of one to two years would make changeover imperative. A promised payout period of three to four years would make detailed feasibility studies advisable.

• Present facilities help determine the size and number of vessels to be installed.

Optimum heat size varies from one melt shop to another, depending on the market served and the size of present processing equipment, such as ladle cranes and blooming mills. But most of the companies told STEEL they would be interested in vessels of the 200 ton class if they were to install pneumatic equipment.

Blast furnace hot metal (or molten pig from cupolas) is a must for operation of an oxygen shop. And the need for a higher hot metal-to-scrap ratio makes it necessary to get the most possible iron

METALGRAMS

. . . news of "Electromet" ferroalloys and metals

UNION CARBIDE METALS

SEPTEMBER 1961

CHARACTERIZATION OF FERROALLOYS -- To provide more complete information to steelmakers, UCM recently published data on the occurrence of hydrogen and non-metallic inclusions in alloy additives. Laboratory and field studies made over a period of many years demonstrate that these raw materials, which are used to control the composition of steel, exert a negligible influence, if any, on the gas content and inclusions present in steel. For details, write for the article, "Alloy Quality Versus Steel Quality," in the Summer 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

TUNGSTEN -- HELPS ALLOYS RESIST HEAT -- Because of tungsten, high-speed steel and non-ferrous tools have cutting edges that stay hard under extreme friction and high temperatures. Hot-work tool steels punch, shear, or form metals at high temperatures without softening. Iron- and cobalt-base turbine blades, afterburners, and tailpipes resist erosion and heat from fast-moving hot gases. Union Carbide Metals supplies ferrotungsten, self-reducing tungsten, scheelite, and tungsten metal powder for such additions. Your UCM representative can give you further information. Also, ask for the article, "The Elements That Surround Us: Tungsten," in the Winter 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

MANGANESE IN ALUMINUM -- In binary alloys, manganese improves the strength of aluminum by 20 per cent with no sacrifice in corrosion resistance. Thus, 3000 series alloys (containing 1.25 per cent manganese) are good general-purpose alloys for storage tanks, piping, furniture, TV antennas, awnings and siding, and chemical equipment. Manganese is also added to 2000, 5000, and 6000 series alloys to improve corrosion resistance. UCM offers low-iron ferromanganese and "Elmang" electrolytic manganese for such additions. More information can be obtained by writing for the article, "Manganese Puts Muscle in Aluminum," in the Winter 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

SALUTE TO STEEL FOUNDRIES -- In 1861, the first steel castings made in the United States were poured in Buffalo, N. Y. They were railroad castings, still an important use of steel castings today. This year, steel foundries observe their first 100 years of serving the railroad, earth-moving and construction equipment, rolling mill, mining equipment, military, oil and gas, automotive, and other industries. Some 275 foundries in the U. S. and Canada can pour about 2 1/2 million tons per year for these uses. Union Carbide Metals wishes the steel foundry industry continued growth and success and looks forward to serving its ferroalloy needs in the future. Your UCM representative is always at your service.

* * *

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A Tinnerman T-Marked Original...

Studebaker Lark assembled faster, at lower cost with SPEED NUTS®

The rear fenders of the new Studebaker Lark are secured in a vibration-proof, watertight seal with this special heavy gauge Tinnerman J-type SPEED NUT brand fastener. It eliminates rubber stripping and costly spot-welded bearing plates, and allows the fenders to be easily removed for repair.

Preassembled to the Lark's rear quarter panel, the J-nuts hold themselves in place while the panel is first attached to the chassis. The fender is then positioned on the quarter panel and the acme bolts driven home.

In applications like this—where *total* fastener reliability is vital—Tinnerman SPEED NUT brand fasteners are your only choice. Only Tinnerman maintains *total* quality control from coil strip selection to finish coat. The Tinnerman T-mark on every fastener is your assurance of that quality.

For samples, literature, prices, call your Tinnerman sales office ... listed in the "Yellow Pages" under "Fasteners." Or write to: *Tinnerman Products, Inc., Dept. 12, Box 6688, Cleveland 1, Ohio.*

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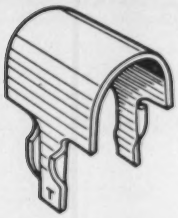
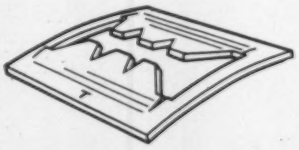
Look for the Tinnerman "T"

T-MARK ENGINEERED SPECIALS



TUBE CLIP is designed for fastening refrigerant tubes to liners. A split rubber cushion insert is placed over the tube, and the entire unit is snapped into a rectangular mounting hole. Spring tension locks the legs in a strong, vibration-proof assembly. Has many application possibilities where tube, cable or wire must be secured.

PRINTED CIRCUIT NUT provides positive contact between printed circuit panels and connecting wires. This highly-conductive, phosphor bronze fastener snaps firmly over terminal area, allows wiring connections to be made at any station on the assembly line. A screw through the eyelet wire completes the assembly. Easy to assemble ... easy to service.



RUBBER STRIP FASTENER locks bumper strips on a famous-name vacuum cleaner, can solve rubber-strip fastening problems in many fields. This SPEED NUT brand fastener is simply pushed over one end of the bumper strip. Triple-tooth prong secures strip firmly while bumper is wrapped around cleaner base and anchored with identical fastener. No special tools required.

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S.A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano Simmonds GMBH, Heidelberg.

from present facilities.

Most steel producers are using or considering beneficiated burdens and the injection of oxygen or combustibles to increase output from blast furnaces. Some operators are employing or contemplating increased top pressures. Such measures aren't likely to provide a hot metal surplus (which could support an oxygen melt shop as well as open hearth facilities). But they may well increase iron output enough to cover the rise in demand for hot metal.

• Choice of an oxygen process is likely to be based on performance in previous installations.

The vertical, top blown oxygen furnace (L-D process) is the most popular pneumatic process with steelmakers in the U. S., at least for now. Reasons: It is uncomplicated and relatively easy to maintain. Its feasibility has been proved in the U. S., in several installations. License rights for the L-D process in the U. S. and Canada are held by Kaiser Engineers Div., Oakland, Calif., of Henry J. Kaiser Co.

The Kaldo process features a tilted vessel that spins at speeds up to 30 rpm. It employs a low pressure oxygen lance to deposit the gas over the hot metal bath. The process promises low nitrogen steels and satisfactory analyses from high phosphorous irons. Marketed in the U. S. and Canada by Dravo Corp., Pittsburgh, the process is said to require more oxygen per ton of steel than a comparable L-D installation, but it can handle a larger proportion of charge scrap.

Steelmen in the U. S. haven't had much opportunity to study the Kaldo process first hand; all installations to date have been in Europe. But a Kaldo plant is under construction at Sharon Steel Corp.'s Roemer Works, Farrell, Pa.

• Other promising methods are in use or under development.

A rotating furnace is also employed in a pneumatic process that is marketed by Demag A. G., Duisburg, Germany, and its affiliate, American Demag Corp., Pittsburgh. A cylindrical vessel, open at both ends, is rotated on a horizontal axis and tilted to position hot metal at one end or the other. Two lances are used. One is dipped into the bath to deliver oxygen for decarbonization. The other lance introduces oxygen above the bath (in a weaker stream) to combine with carbon dioxide evolved from the primary process reaction. The process is said to produce low nitrogen steels and to use a relatively high percentage of scrap.

A variation of the Rotor process, developed recently in Germany, employs a vessel that is elliptical in section to insure intensive mixing of the bath and slag.

Two other pneumatic methods used in Europe, the LD-AC and French OLP (oxygen lime powder) processes, feature the simultaneous introduction of oxygen and powdered lime into the vessel; the lime insures rapid dephosphorization. Another process makes use of lump lime to produce similar results.

Bottom blown bessemer vessels are employed in two other pneumatic processes. One of them, the Phoenix-Lance process, involves bottom blowing at the beginning of the heat, interruption to introduce oxygen from above the bath, and completion of the heat by bottom blowing. Another process, employed in the U. S. by Wheeling Steel Corp., and by the Steel Co. of Wales Ltd., features the introduction of oxygen and steam through tuyeres at the bottom of a conventional bessemer vessel.

• Updating of open hearths may slow the swing to oxygen furnaces.

Introduction of roof lances has increased the output of many open hearth furnaces, and the use of oxygen-fuel gas burners promises still higher production rates.

The development of refractories that can take the high temperatures from oxygen lancing have helped keep open hearth steelmaking competitive.

Modular construction—the building of whole sections of roofs, end walls, and other major furnace assemblies—has helped increase furnace availability.

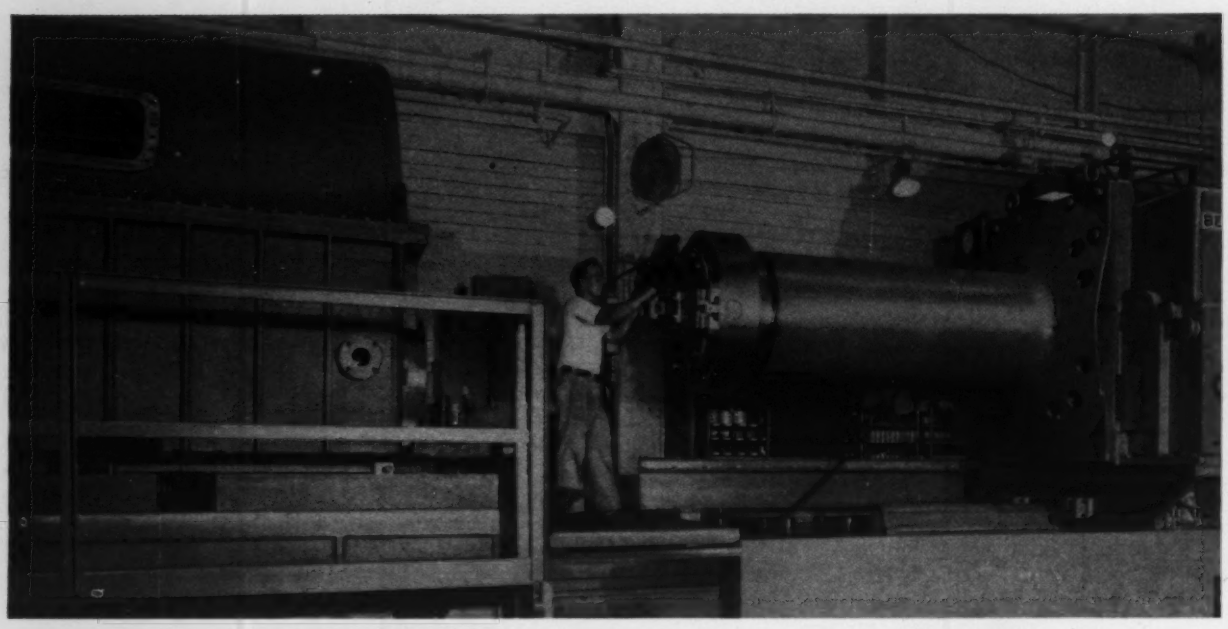
Betatron Checks Out Reactor Vessels

A BETATRON rated at 25 million electron volts is used in the final inspection of a 66 ton reactor pressure vessel at the West Allis (Wis.) Works of Allis-Chalmers Mfg. Co.

All welds in the 11½ ft diameter vessel were 100 per cent inspected after each stage of assembly prior to this final spotcheck—it comes after stress relieving. The betatron can readily penetrate 18 in. of steel and detect welding defects as small as 0.025 in. in diameter.

After final machining and prior to shipment, the reactor pressure vessel is hydrostatically tested at 1050 psi. The unit is intended for the 66,000 kw Pathfinder atomic powerplant being built for Northern States Power Co.

FARREL-BETTS HORIZONTAL BORING MACHINES—Typical of the highly specialized designs, developed by company engineers to meet individual requirements, is this 250-ton boring machine. With its installation, the customer was able to reduce by 50% the floor-to-floor time formerly required for boring large machine housings. Accuracy is higher, too.



HEAVY-DUTY

some of the largest ever built..

Shown here is a random selection from the diversified line of heavy-duty machine tools designed and built by Consolidated. Many of these are available in the largest sizes ever produced anywhere in the world.

But, more important than sheer physical dimension is the way these machines combine size with a degree of accuracy you would expect to find only in much smaller tools. That, and ease of operation, too, which is another of their outstanding characteristics.

When you are in the market for heavy-duty machine tools – either standard or special – it will pay you to call Consolidated.

In the meantime, send for bulletins describing in detail the machines with which you are concerned. Or, perhaps you would like to discuss your problems with a company representative.

FARREL-BIRMINGHAM COMPANY, INC.
CONSOLIDATED MACHINE TOOL DIVISION
565 Blossom Road, Rochester 10, New York
Telephone: BUtler 8-4600
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

CM-65

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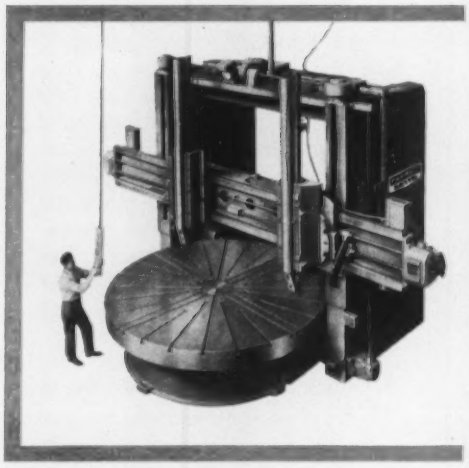
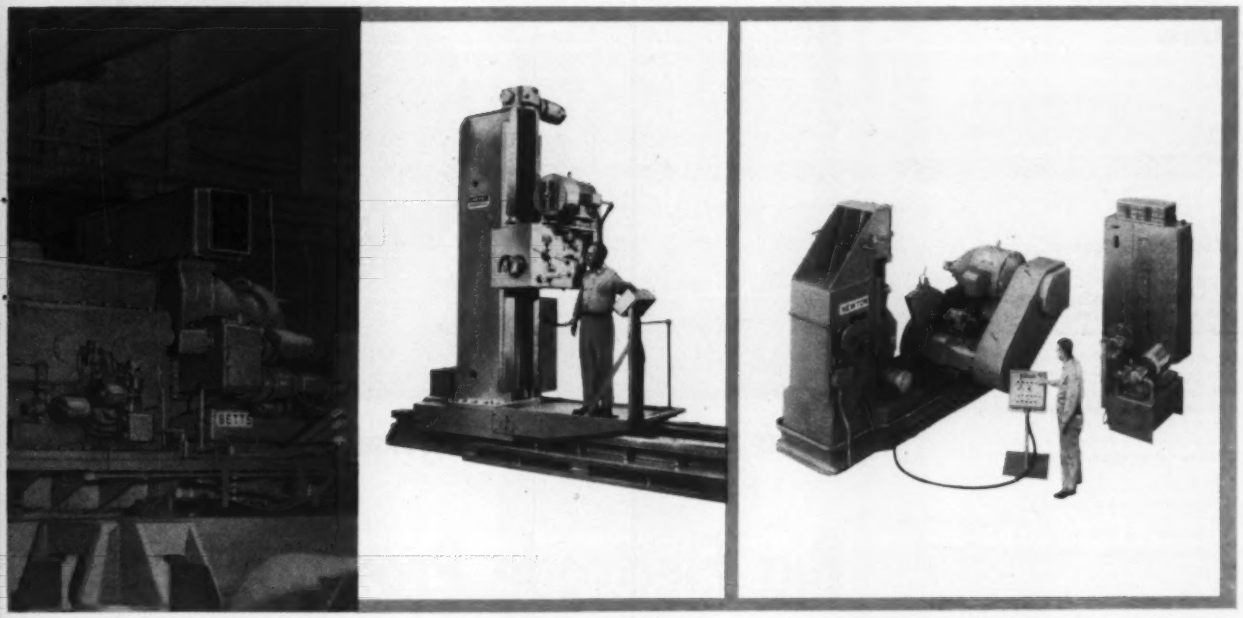


FARREL-BETTS VERTICAL BORING MILLS combine accuracy and operational convenience. Made in standard swing sizes, ranging from 7' to 42' or even larger, they can be "tailored" to suit specific requirements by means of the many optional features and alternative constructions available.

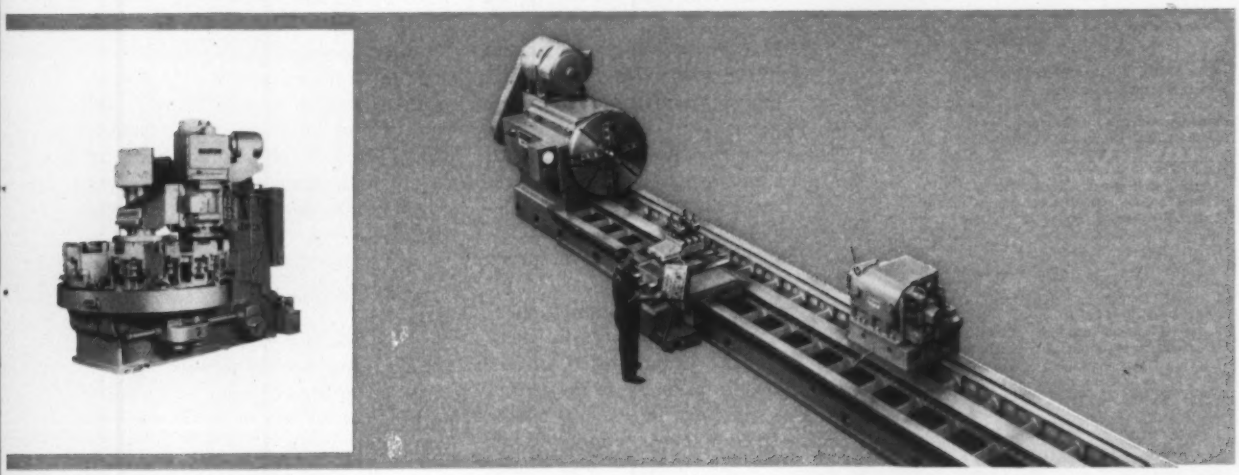
FARREL-NEWTON BEAM MILLERS—Designed for end milling of structural beams, these machines are built in capacities of vertical travel from 4' to 12' and horizontal travel from 8' to 60'. The machine shown has a horizontal and vertical feed range of 6" to 100" per minute with infinite changes within this range.

FARREL-NEWTON COLD-SAW MACHINES are made in a range of sizes from 32" to 120" (saw-blade diameter) for cutting ferrous or nonferrous metals. Illustrated is a 60" machine for cutting aluminum billets in sizes up to 22" diameter.



MACHINE TOOLS

in a line as broad as your requirements



FARREL-NEWTON MILLING MACHINES — The Farrel-Newton vertical rotary, shown above, has been termed the fastest known method of milling the flat surfaces of repetitive pieces. Other production-line millers — straight-line, vertical and horizontal openside, sliding-head and other types — are made to suit individual needs.

FARREL-BETTS LATHES—Pictured here is the new 3-way bed lathe which provides more rigid support of tool and work, less setup time, and centralized control. Other lathes with 2, 3 or 4 ways are made in standard or special designs in swing sizes from 42" to 144" or larger.

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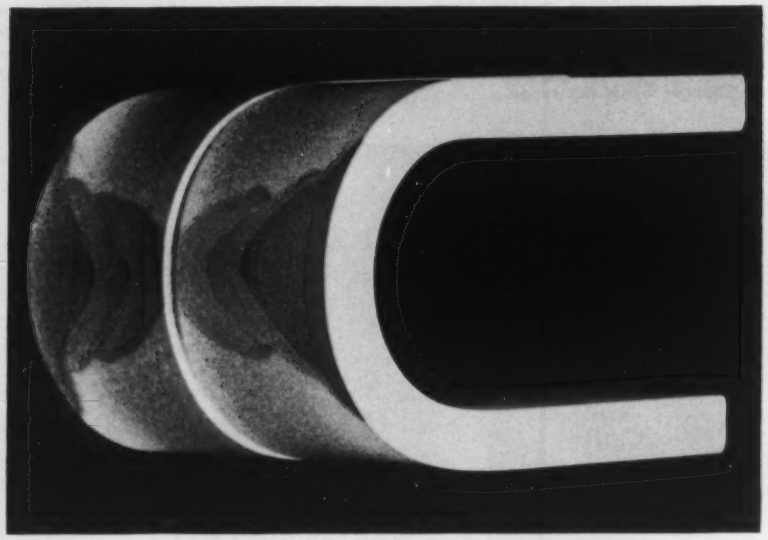

Welds pass ASME pressure vessel tests . . .

Big Electrode Promoted For Big Aluminum Plate

• A NEW technique for welding thick aluminum features a 7/32 in. electrode.

Developed by Kaiser Aluminum & Chemical Corp., Oakland, Calif., the method is said to include these advantages:

• Deposit rates up to 15 lb an hour are readily attained—two to three times faster than conventional Mig-arc methods. (That can be extended to 20 lb an hour under special conditions.)

• Buttwelds in 3 in. plates (above) of 5083 and 5456 alloys consistently meet the requirements of the ASME code for pressure vessels.

• The method needs no special welding equipment. Submerged arc machines are suitable with simple modifications to handle the large electrode.

• Kaiser filler wires up to 7/32 in. are nearly twice as large as those normally employed.

Maximum size of conventional, gas shielded methods is about 1/8 in., says Kaiser. The greater portion of aluminum welding is normally done with electrodes half that size.

The larger electrodes proposed by Kaiser require heavier feeders and power supplies, as would be expected. Most of the submerged arc equipment employed for welding steel can be converted by replacing the flux and contact tube system with a water cooled, inert gas welding barrel.

• The new process operates with a much lower current density.

In general, say Kaiser technicians, a range of 15,000 to 30,000 amperes per square inch is enough for most applications. That compares with 50,000 to 100,000 amperes for smaller filler wires.

Two passes are normally employed for plates up to 1½ in. thick.

The large wire method is expected to be preferred for plates over 2 in. thick.

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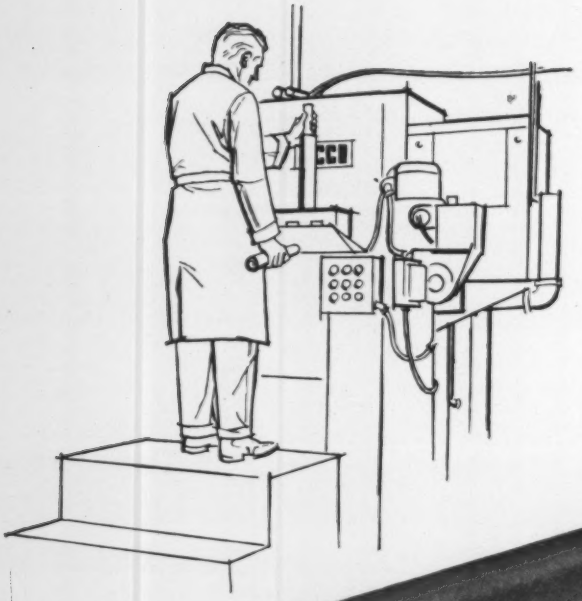
New Ideas for your products are suggested in Data Unit No. 115, available free from any member of the Malleable Castings Council, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

The castings shown have been painted, blued, chromium and cadmium plated, plastic coated, porcelain enameled, galvanized, and machined.



TOCCO Induction Hardening

Boosts Track Pin Production 10 Times

The Eimco Corporation of Salt Lake City are producers of heavy-duty earth moving and mining equipment. They recently replaced a low production induction hardening method with a modern, more efficient track pin hardening machine engineered and built by TOCCO for high production operation.

Production Jumped from 208 pins per shift to over 2000 using only one operator. Powered by a 200 KW 3 KC TOCCO motor generator, the new machine produces parts of higher uniform quality with correspondingly better results in service.

Additional Saving is obtained because TOCCO's new continuous roll feed machine does not need center holes in the pins, eliminating two centering operations on each pin.

It will pay you to have a TOCCO sales engineer review your heat treating applications. He can help you boost production and cut costs by the engineered application of induction heating.

THE OHIO CRANKSHAFT COMPANY

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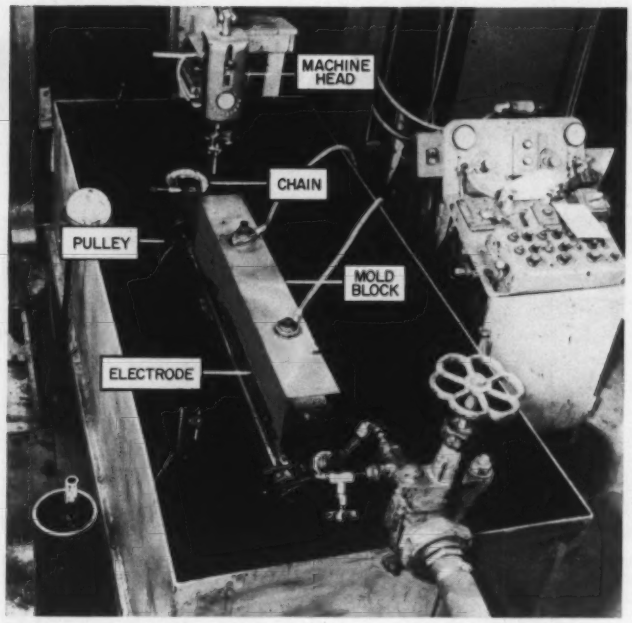
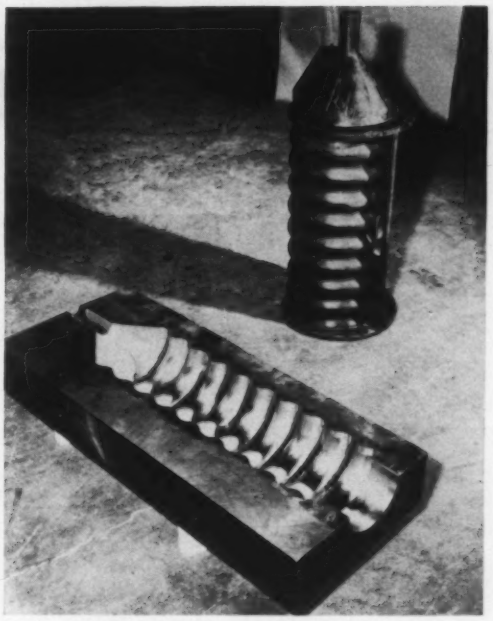


This special fixture rotated the blade electrode to generate the cylindrical mold cavity. Via the chain and pulley, vertical motion of the machine head turned the electrode.



At right, the finished mold half. Above it is the molded rubber protector for electrical insulators on high voltage power lines

An Electrode 'Sweeps' a Mold Cavity

• A CONTOURED blade of graphite was rotated slowly through a rough machined cavity. It machined, via electrical discharge, mold halves for rubber protectors that cover large insulators on electric power lines.

The unconventional sweep technique finished the cylindrical cavity 8 in. in diameter and 30 in. long. Stanley H. Holmes, president, Stanley H. Holmes Co., Chicago, says the technique worked better than conventional electrodes would have. The sweep motion generated concentricity in the molds, and extremely close tolerances were held. Further, he estimates patterns and conventional electrodes would have cost roughly $1500 for the job. The three blade electrodes cost about $200.

In conventional electrical discharge machining, the electrode is a three dimensional, convex replica of the concave cavity to be generated. The electrode would be plunged, at a controlled rate, straight into the mold block.

• A special fixture rotated the electrode.

To make the mold for the protector, Mr. Holmes placed the mold block on its side, and set up the electrode to sweep the cavity. The electrodes were ½ in. thick graphite, cut to the contours of the finished mold.

Normal motion of the machine head is vertical. To make the electrode sweep a circular path, it was clamped on a shaft mounted between insulated bearings. A pulley on one end of the shaft had a chain fastened to and around it which ran to the head of the machine. Vertical motion of the head pulled the chain and rotated the electrode.

It took 40 to 50 hours to machine one half of the mold, says Mr. Holmes. He made three cuts, a roughing cut at full power and two finishing cuts at reduced power.

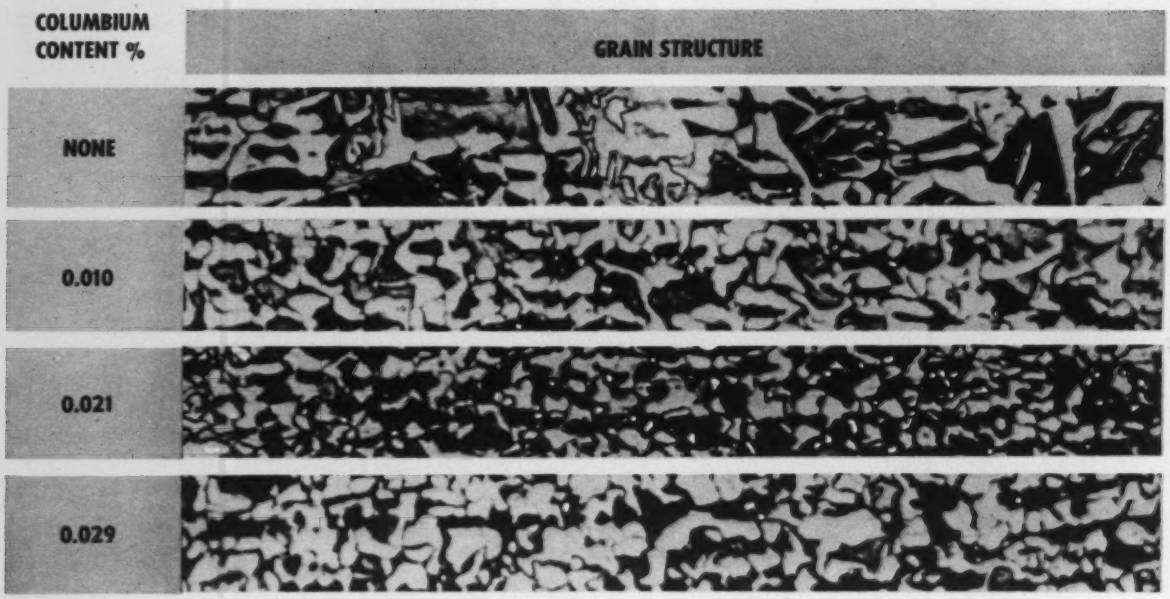
The electromachining steps removed about 450 cu in. of metal. In a first operation, hogging cuts on a vertical milling machine removed the bulk of the cavity (to within 1 in. of size), but no contouring was done by milling.

The electrodes were cut on an automatic tracer and template setup. Then the electrodes were dressed twice during the cutting cycle on the same setup.

The machine Mr. Holmes uses is a Sparcatron. It's made and sold by Easco Products, Ypsilanti, Mich., under license from its British manufacturer. With a standard power source, the machine will remove 1¼ cu in. of metal an hour. With a supplementary power unit, a rotary impulse generator and associated circuitry, the machine will remove 10 cu in. of metal an hour and still retain fine detail.

The table of the machine was too small to hold the mold, so he adapted a planer to hold an oil tank 33 by 76 in. The head of the Sparcatron was removed from its machine and fastened to the planer's tool post.

Columbium Treated Steel



Addition of columbium reduces grain size of steel, increases yield and tensile strengths

• STEEL containing columbium promises pipeline builders all-weather weldability, higher strength, thinner wall pipe, and significant savings in the construction of large capacity, natural gas transmission lines. It is said to have cut $1000 per mile from the average installed cost of conventional, high strength steel in a 47 mile, 20 in. line in eastern Texas.

The steel, called XC-60, was developed, produced, fabricated, and field tested in a two year program just completed by Natural Gas Pipeline Co. of America, Chicago; A. O. Smith Corp., Milwaukee; and Great Lakes Steel Corp., Detroit, a subsidiary of National Steel Corp.

• Use of thinner wall pipe was said to decrease steel requirements about 35 tons per mile of pipe; to lower field welding costs; and to reduce handling costs.

The 47 mile line required about 6580 tons of pipe, fabricated from 1/4 in. plates of columbium-additive steel. Pipe wall strength was 60,000 psi, minimum yield; the same design strength goal would have called for 8225 tons of 5/16 in. wall pipe, made of conventional, high strength steel, the companies report. The saving of 1645 tons of steel more than made up for a $15 to $20 per ton premium on the columbium grade.

Girth welding of the XC-60 was said to cost about $2200 per mile vs. $3000 per mile for conventional pipe. Not included: The cost of preheating for cold weather welding (said to be necessary when conventional pipe is welded at temperatures below 40° F because of relatively high percentages of carbon and manganese, added for high strength). Such preheating could increase welding costs per mile by $500 or more.

The columbium steel pipe, which contains about 30 per cent less carbon and 25 to 35 per cent less manganese than the highest strength grade of pipe steel in general use, was welded with standard equipment. Conventional welding methods were employed, at ambient temperatures of 70 to −25° F, without preheating. (Subzero weld tests were made in refrigerated railroad cars.) Weld metal and weld heat requirements were said to be less than for conventional pipe.

• Fine grain structure of columbium steels is said to improve yield and tensile strengths.

"Columbium as a steel additive has a strong affinity for carbon and acts as a ferrite former on the crystalline structure of the steel," says A. G. Barkow, superintendent of inspection for Natural Gas Pipeline, in a recent report. "That tends to produce a finer grain structure, which improves yield and tensile strength. The carbide forming tendency of columbium is so strong that it is found frequently in the structure as an undissolved carbide. Hardenability of the steel is reduced, and weldability is improved.

"The columbium has little effect on ductility (measured by elongation and area reduction). Result:

Promises Pipeline Savings

Cold weather weldability is proved in the laboratory

Field welds are completely free of underbead cracks

Carbon content can be lowered to improve weldability without decreasing material strength."

• Several semikilled steels of the same general type were developed and used during the two year test.

The steels are similar in chemistry to a group of columbium grades marketed by National Steel's Weirton Steel Div. and Great Lakes Steel Corp. for high strength, lightweight applications in the automotive and heavy equipment industries.

Basic analysis of the steel—set as a goal for the development program—included 0.26 per cent carbon, 1.30 per cent manganese, and 0.05 per cent columbium, as maximum values. A minimum yield strength of 60,000 psi and a minimum ultimate strength of 78,000 psi were considered adequate. Those analysis and performance specifications were modified somewhat during the development and test period.

In the first phase of the program, steels of various chemical combinations were made to determine the best analysis for future work. The second phase included the manufacture and installation of 4¼ miles of 24 in. pipe (0.250 in. wall thickness) and 1¾ miles of 30 in. pipe (0.312 in. wall thickness) in an operating pipeline.

Third phase: Production and installation of 47 miles of 20 in. OD pipe with a 0.250 in. wall thickness, and operation of the line at 900 psi. Steel used in the third phase pipe contained 0.20 to 0.27 per cent carbon, 0.89 to 1.28 per cent manganese, and 0.006 to 0.018 per cent columbium. Yield strengths were 65,000 to 83,000 psi, and ultimate strengths ranged from 82,000 to 101,000 psi.

• Conventional equipment was used for fabrication and field bending. Inspection showed crackfree welds, and burst tests documented proper ductility.

All pipe was made by the same manufacturing methods used on conventional, flash welded pipe, at A. O. Smith Corp.'s Milwaukee and Houston plants. The 20 in. pipe, expanded mechanically, showed an effective increase in yield strength of about 5000 psi vs. about 10,000 psi for conventional steels, says Mr. Barkow.

Forming and welding presented no problems. The pipe was hydrostatically tested to 90 per cent of minimum specified yield for a fiber stress of 54,000 psi.

Two burst tests made on the 20 in. pipe (40 ft lengths) produced ruptures about 5 ft long; each was a 100 per cent ductile shear fracture. Failure stress correlated completely with strip tensile tests taken previously. (Burst tests on other pipe sizes agree with those on the 20 in. pipe.) Retention of ductility at low temperatures promises to reduce the incidence of high velocity tears, which could open up a pipeline for hundreds of yards, or even several miles.

"The 47 mile pipeline is probably the strongest and freest from

The case of the Look-Alike Sockets, or . . .

Does an ***800% SAVING*** *interest you?*

Maybe hand tool purchasing is one of your minor responsibilities, but saving money's right down your alley. And these look-alike socket wrenches offer a case in point.

A large automobile manufacturer recently tested newly developed SNAP-ON® impact sockets along with a prominent competitive brand. The test was made under identical conditions. The competitive sockets wore out after tightening down an average of 10,500 bolts per socket. The new SNAP-ON sockets averaged 112,000 bolts per socket — stood up over ten times as long!

Ten competitive sockets cost a total of $13.50; a single SNAP-ON socket cost $1.65 — a saving of over 800 percent. Should you be concerned with sockets and other small tools?

There are many aspects of hand and production tool application you can talk over profitably with a SNAP-ON sales engineer. Fine tools are his business — his only business. He can give competent advice on proper tool selection, decentralized tool cribs, mobile tool chests; offer suggestions on field service kits, tool sets for original equipment.

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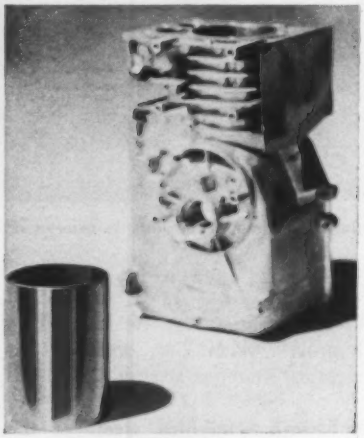
weld defects ever built," says Mr. Barkow. Radiographic tests on the line were said to indicate complete freedom from cracks. Earlier, laboratory tests were reported to show 100 per cent resistance to underbead cracking of the XC-60 in weldments vs. 95 per cent for conventional pipeline steel.

The columbium steel pipe was bent as easily as conventional, high strength steel pipe, to follow pipeline ditches, Mr. Barkow reported. Slightly longer pulls had to be made with the bending equipment to allow for "springback," but bending foremen reported more nearly uniform bends than with conventional pipe.

Outdoor storage failed to age harden the columbium steel pipe enough to impair field weldability.



Powder Metal Liner Extends Engine Life

AFTER 500 hours at full throttle, small two and four cycle engines equipped with newly developed powder metal cylinder liners showed only negligible piston ring wear, claims Amplex Div., Chrysler Corp., Detroit.

A new Oilite alloy (W-982) is said to be responsible for the improvement. Engineers point out that the aluminum block metal infiltrates the liner walls, bonding it securely.

The liners are pressed so precisely that they only require honing before installation.

The firm also claims the product cuts costs.

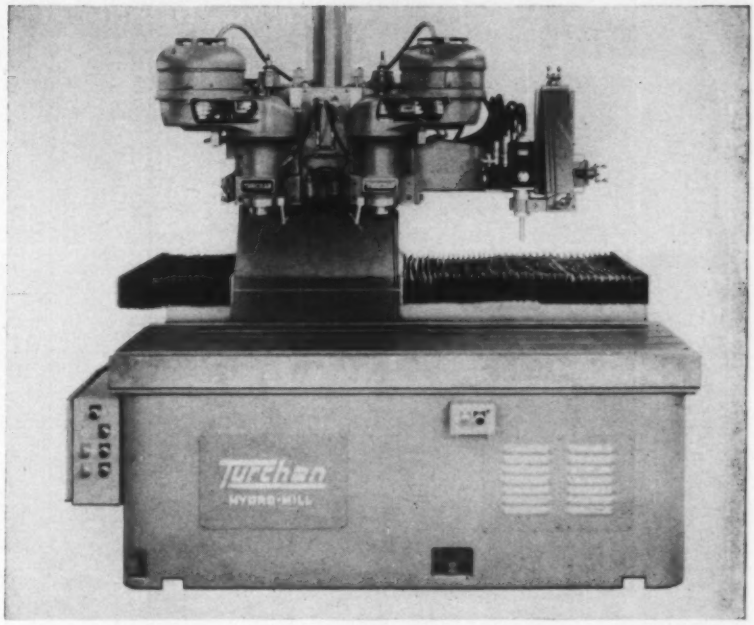
Two Spindle Mill Does Three Dimensional Tracing

BOTH SPINDLES of a two spindle, automatic tracer mill developed by Turchan operate in three dimensions. The unit, called a Hydro-Mill, has a stationary, 20¾ x 78¼ in. worktable to accommodate parts and models up to 36 x 13 x 12 in. Center distance between spindles is 18 in.

A Turchan tracer control is provided for profiling and contouring. The tracer unit controls hydraulic actuators on the vertical slide, saddle, and ram. Feed rates on all three dimensions are 0 to 40 in. per minute.

Motors up to 5 hp are available for each spindle. You can get spindle speeds from 150 to 11,750 rpm.

The manufacturer says that the range permits machining of tough metals, fast machining of nonferrous metals, and grinding. Spindles are mist lubricated. Ways are completely covered.



Other features of the automatic tracer mill include auxiliary spindle controls, separate lead screw adjustment on each spindle, a self-contained power unit in the machine bed, and automatic spindle brakes.

For further information, *write* Turchan Follower Machine Co., Box 157, Inkster, Mich.

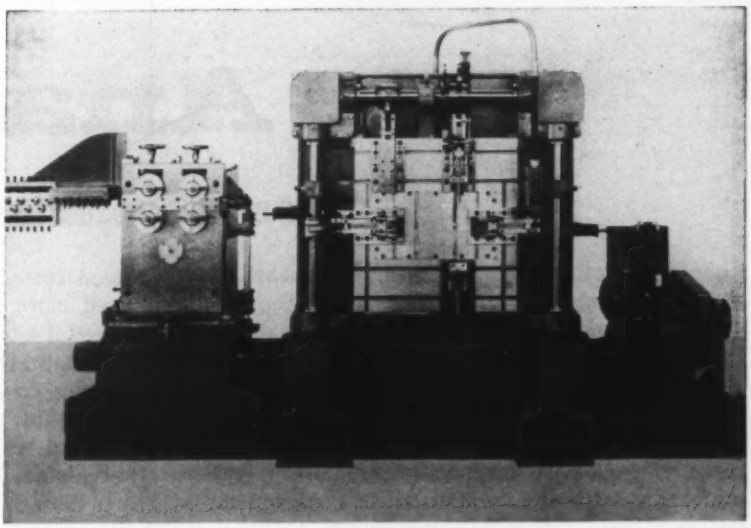
Machine Forms Parts from Wire, Narrow Strip

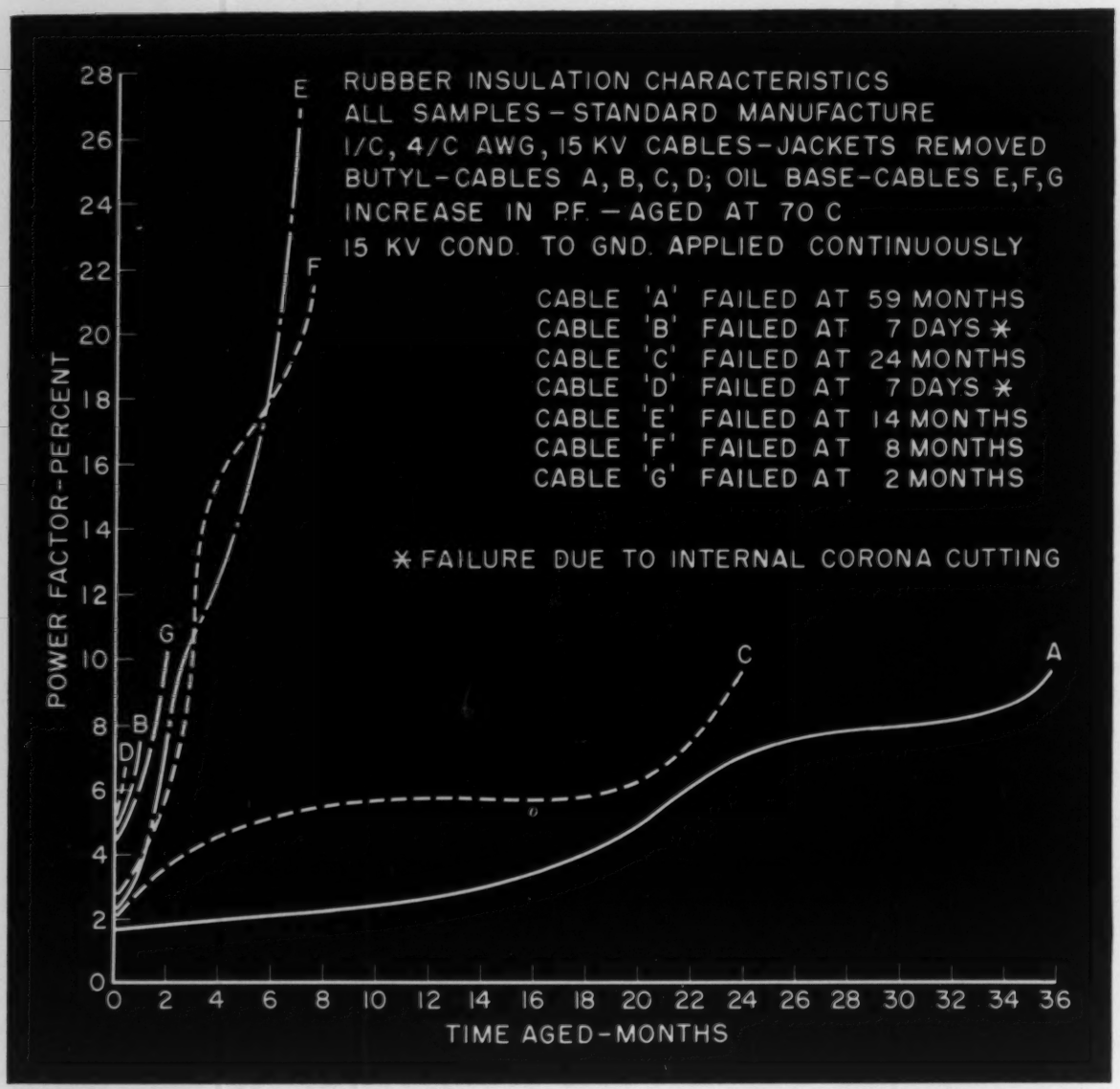
LONG WIRE and strip parts at feed lengths up to 24 in. and speeds as high as 120 parts a minute can be formed on the Torrington VLW-83 Verti-Slide.

Modular design of feed, drive, press, and forming units provides flexibility and versatility for producing a wide range of precise metal shapes and forms. As many as eight, interchangeable, forming slide units can be mounted at any desired position in the T-slots at the top, bottom, and sides of the large tooling plate.

Maximum wire diameter is 0.250 in. for limited bends and 0.207 in. for unlimited bends. Maximum strip width is ¾ in. Standard slide

(*Please turn to Page* 166)

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ALL SAMPLES - STANDARD MANUFACTURE
1/C, 4/C AWG, 15 KV CABLES - JACKETS REMOVED
BUTYL - CABLES A, B, C, D; OIL BASE - CABLES E, F, G
INCREASE IN P.F. - AGED AT 70 C
15 KV COND. TO GND. APPLIED CONTINUOUSLY
CABLE 'A' FAILED AT 59 MONTHS
CABLE 'B' FAILED AT 7 DAYS *
CABLE 'C' FAILED AT 24 MONTHS
CABLE 'D' FAILED AT 7 DAYS *
CABLE 'E' FAILED AT 14 MONTHS
CABLE 'F' FAILED AT 8 MONTHS
CABLE 'G' FAILED AT 2 MONTHS
* FAILURE DUE TO INTERNAL CORONA CUTTING
POWER FACTOR-PERCENT
TIME AGED-MONTHS
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28
A
B
C
D
E
F
G

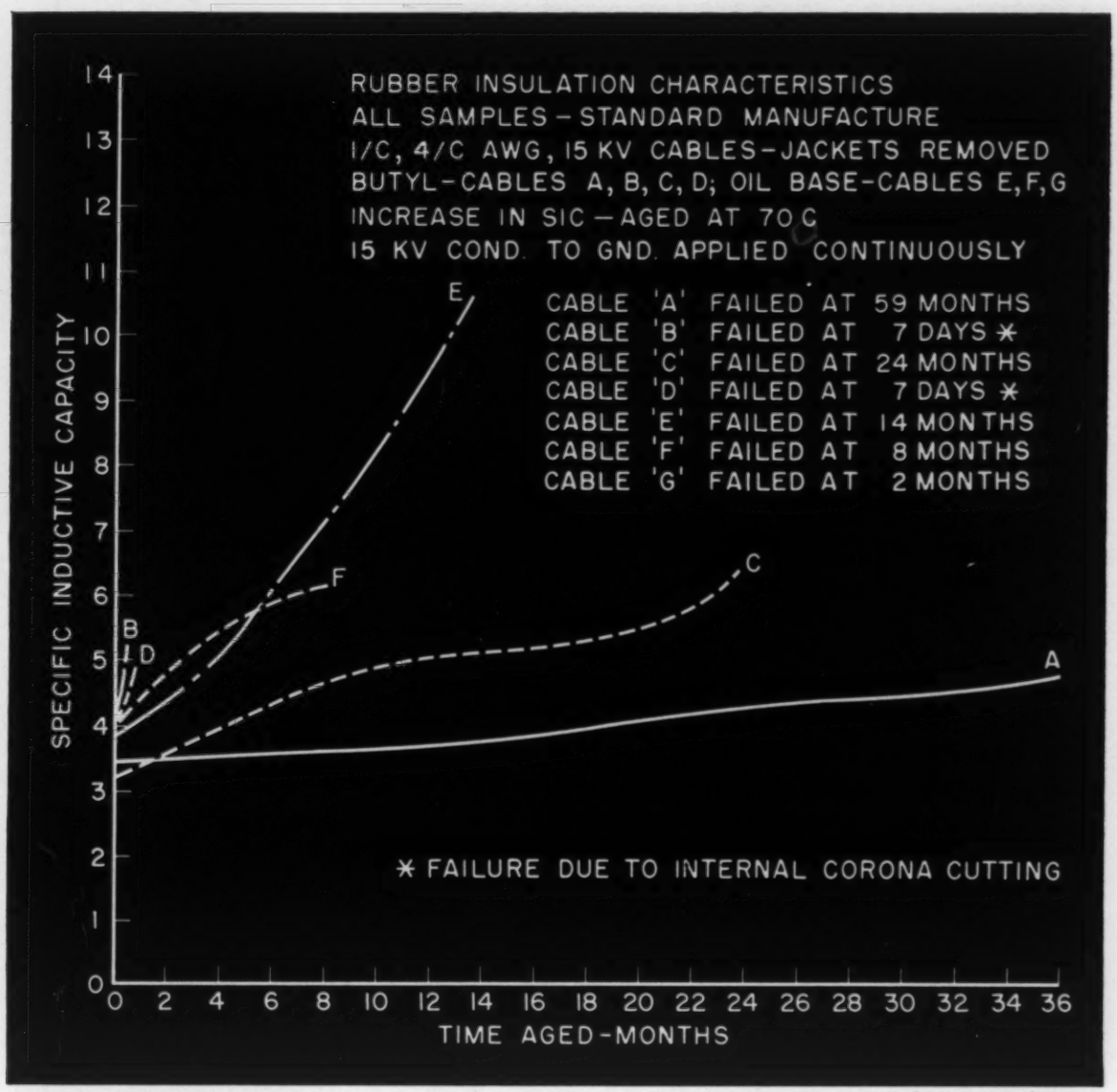
DURASHEATH LASTED TWICE AS LONG AS NEXT-BEST RUBBER CABLE. Cables were submerged in water heated to 70C, and 15000 volts conductor-to-ground applied

Anaconda

These accelerated-life tests prove

Anaconda proved the big difference in rubber insulations by buying competitive cables on the open market, taking a random sample of an Anaconda Durasheath cable out of stock, and running them all through a five-year *underwater test at 173% RATED VOLTAGE*. This extra-rugged non-standard test comes closer, on an accelerated basis, to correlating cable performance under actual operating conditions than any industry test. As you can see, Anaconda Durasheath ("A" in the chart) lasted more than twice as long as the next-best cable—59 months compared to 24 months.

Durasheath quality is the result of three factors: Superior compounds resulting from years of developmental research and constant improvement; advanced techniques of manufacture; and better ingredients. For instance, Anaconda Butyl (AB) insulation is compounded with only nonhygro-


RUBBER INSULATION CHARACTERISTICS
ALL SAMPLES – STANDARD MANUFACTURE
1/C, 4/C AWG, 15 KV CABLES – JACKETS REMOVED
BUTYL – CABLES A, B, C, D; OIL BASE – CABLES E, F, G
INCREASE IN SIC – AGED AT 70 C
15 KV COND. TO GND. APPLIED CONTINUOUSLY
CABLE 'A' FAILED AT 59 MONTHS
CABLE 'B' FAILED AT 7 DAYS *
CABLE 'C' FAILED AT 24 MONTHS
CABLE 'D' FAILED AT 7 DAYS *
CABLE 'E' FAILED AT 14 MONTHS
CABLE 'F' FAILED AT 8 MONTHS
CABLE 'G' FAILED AT 2 MONTHS
SPECIFIC INDUCTIVE CAPACITY
TIME AGED-MONTHS
* FAILURE DUE TO INTERNAL CORONA CUTTING
A
B
C
D
E
F

continuously. Where other cables had failed completely, Durasheath's power factor (line A, left) had increased from 1.5 to only 7.1; SIC (line A, right) from 3.5 to 4.3.

proves it!

there is a difference in rubber insulations

scopic fillers to prevent increase in power factor by moisture absorption.

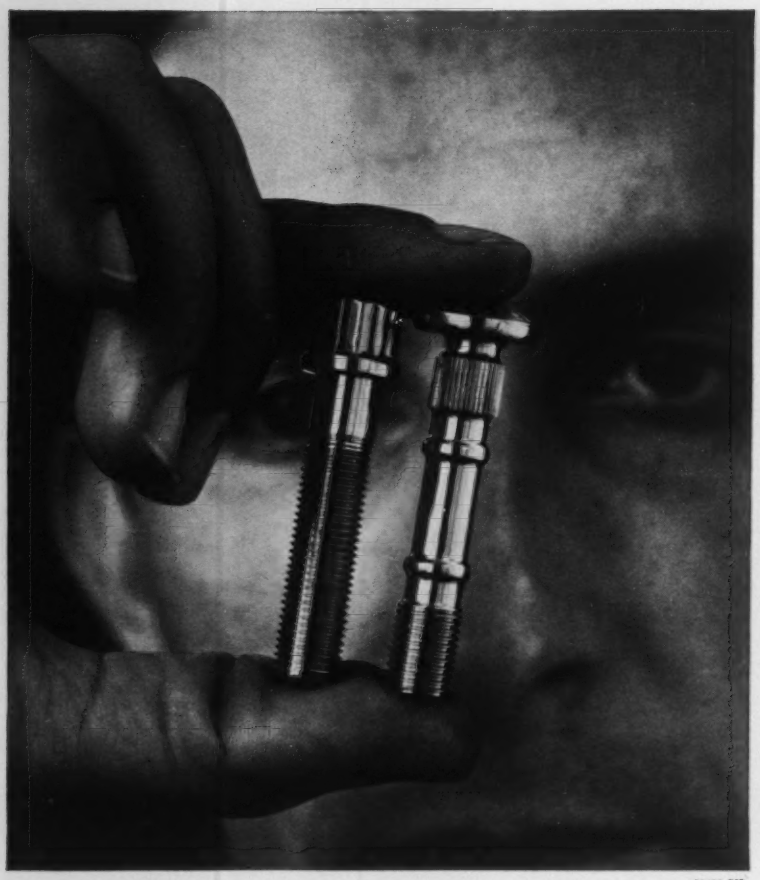
Durasheath's superiority is now further improved by a uniquely new "Uniblend" mixing process which literally homogenizes the Butyl mixture, disperses all the components thoroughly to prevent variations in the high dielectric strength of Anaconda Butyl (AB) insulation.

For more facts on Durasheath and Anaconda's new Uniblend mixing process, contact Anaconda Wire and Cable Company, 25 Broadway, New York 4, New York, Department EFL-2-S. 61249

ASK THE MAN FROM

ANACONDA®

FOR DURASHEATH BUTYL-INSULATED CABLE



10426-CH

How *critical* can you be in your selection of a fastener for a special application . . . especially when extreme accuracy, reliability and consistent performance are specifications. For over thirty years, Chandler has been producing special fasteners and standard cap screws and bolts that meet these demanding requirements.

If you have a special fastener problem . . . here's what you can expect from Chandler. *Into the design* of your special fastener goes the knowledge of expert Chandler engineers . . . careful attention to detail and exhaustive testing to meet critical standards . . . advanced production methods to assure on-time delivery . . . RESULT . . . a precise fastener, custom-tailored and mass-produced at the most favorable cost.

Next time . . . Check with Chandler . . . FIRST.

Write today for your Chandler catalog.

CP

chandler Products Corporation

1488 Chardon Road • Cleveland 17, Ohio

NEW PRODUCTS and equipment

(*Concluded from Page* 163)

strokes are 2½ in. at top (4 in. is also available) and 4 in. at the bottom and sides. Slides can be actuated through box cams for high production or more economical plate cams with spring or air return for short runs.

The center form can be adjusted over a lateral range of 24 in. in the 13⅞ x 26⅝ in. tool plate (interchangeable for fast setup on repeat jobs). In addition to adjustments along the wire line, the rear motions can be tilted within 10 degrees up or down to compensate for springback on right angle bends.

The forming unit includes camshafts, tool plates, and forming slides. The company says camshafts can be easily removed through the bevel gears and corner gear cases to add or remove cam hubs.

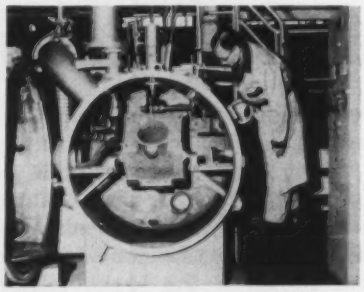
The slide gears can be set for 90 or 180 degree feed. You can move the feed unit in or out to change the wire line distance to the forming area. Presses, also powered from the lower camshaft, can be located on the wire line at either side of the forming unit.

For further information, *write* Machine Div., Torrington Mfg. Co., Torrington, Conn.

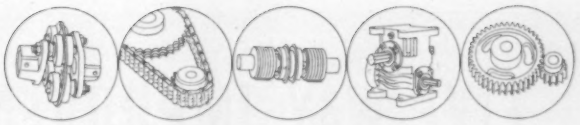
Vacuum Furnaces Offered

TWO vacuum furnaces have been developed by Stokes. One, Model 436-504, has a capacity of 50 lb and is designed for research and development or small quantity production. The other, Model 435-585, is a cold wall, resistance heated, heat treating furnace of medium size capable of operating up to 3000° F.

Model 436-504 features a large



This induction heated, vacuum melting furnace has a 50 lb capacity



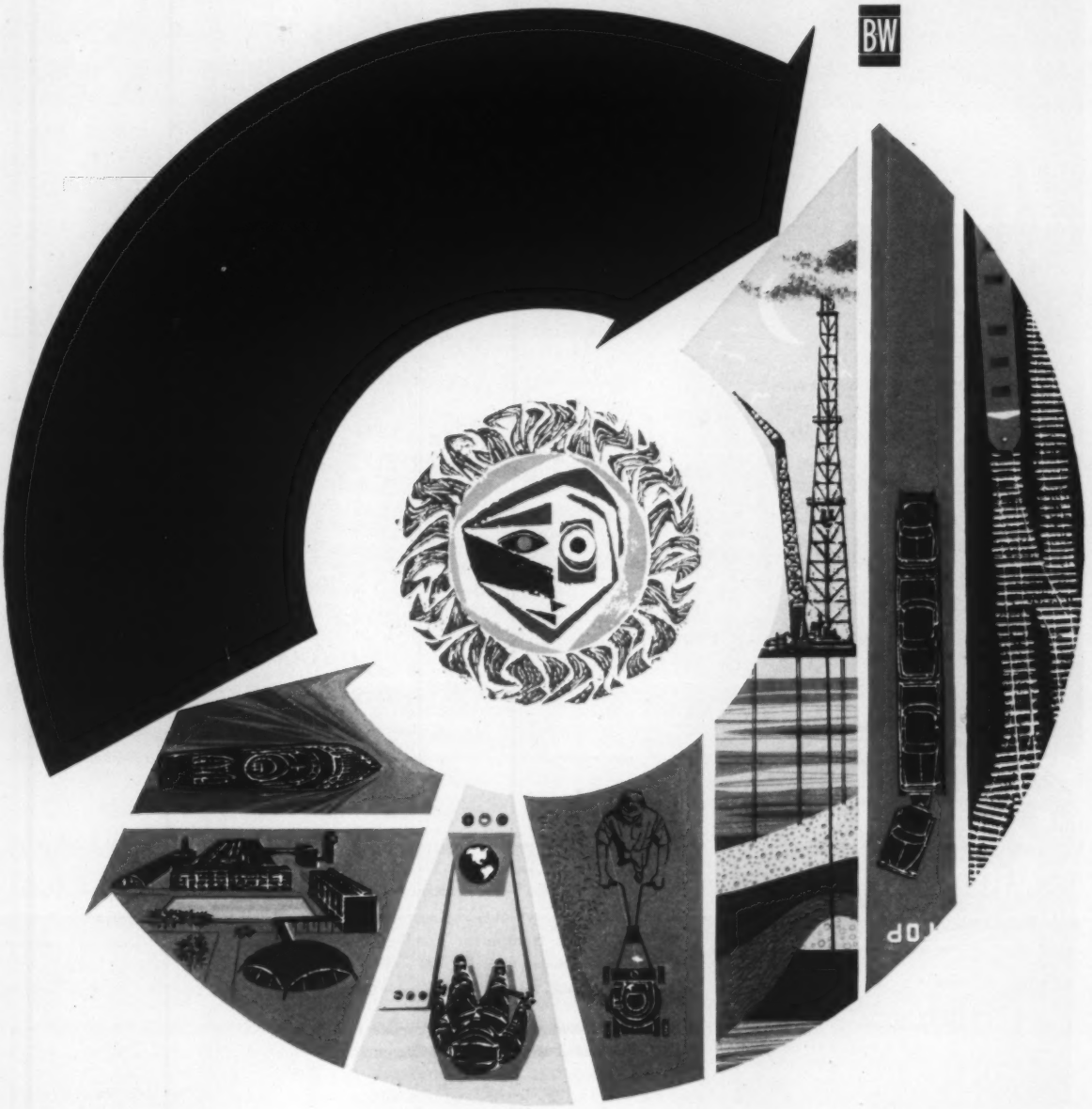
Morse has an answer to every industrial drive problem under the sun

From oil rigs, boats, and cars to missiles, mowers and machinery—look first to Morse for transmission of motion or power. You'll get impartial engineering help and immediate delivery on a complete range of products: Basic Drives, Speed Reducers, Couplings, and Clutches. Basic Drives alone include stock gears, roller chain, silent chain, "Timing"® Belt, and Hy-Vo® Drives. You'll find your Morse man in the Yellow Pages. Or write: Morse Chain Co., Dept. 2-91, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

MORSE

A BORG·WARNER INDUSTRY

BW



FIVE-WAY IMPROVEMENT

in grinding operations with the new cutting fluid, FIVE-STAR CIMCOOL, on the job in Pennsylvania.

(Company name on request)

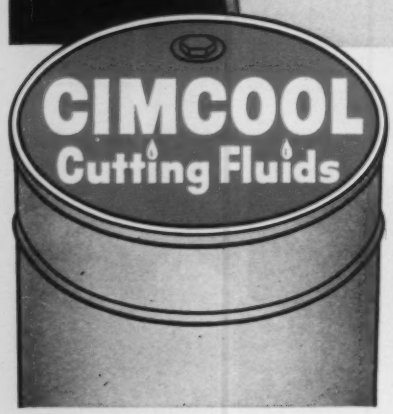
FIELD SERVICE REPORT

in the manufacture of air compressors. They had tried several cutting fluids but kept having problems with rust, rancidity and skin irritation.

Then we installed Five-Star Cimcool at 50-1 for a 3 months test, grinding iron, stainless steel, tool steel and aluminum. The results were excellent.

They have no rancidity, even after 3 months operation. They proved by laboratory testing that skin irritation had been eliminated. There was no rusting of iron or steel, no corrosion of bronze or aluminum parts. They not only saved money by not having to change the cutting fluid, but they doubled the pieces per dress. They are very enthusiastic about Five-Star Cimcool.

Herb Whitacre
Pittsburgh Office



FOR 100% OF ALL METAL CUTTING JOBS

Production-Proved products of The Cincinnati Milling Machine Co.

FIVE-STAR CIMCOOL°—New, versatile "one-mix" cutting fluid, long-lasting, trouble-free.
CIMPERIAL° — Heavy duty replacement for cutting oils in those low-speed tough jobs.
CIMPLUS — The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS) — For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Marks Reg. U. S. Pat. Off.

capacity, alloy additions system. The system uses four 36 cu. in. buckets and one 200 cu. in. bucket enclosed in a single, compact chamber together with a vibrated trough and chute. The chamber lid (full opening type) is transparent to permit viewing of the additions procedure. Buckets can be emptied into the chute in any sequence.

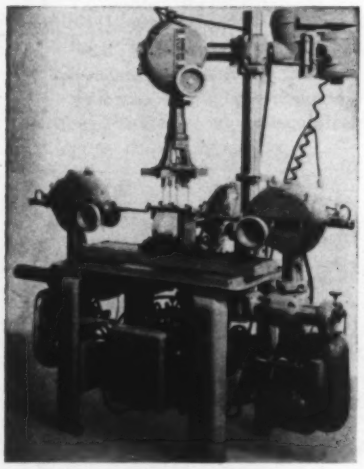
The heat treating furnace (Model 435-585) is a package unit which fills the gap in the Stokes line between small, laboratory scale furnaces and large, production scale furnaces. The hot zone is 11 in. in diameter and 12 in. high. The vacuum chamber is top loaded. The unit is designed for heat treating, brazing, degassing, and other high temperature applications.

See them at Booth 268, National Metal Exposition, Cobo Hall, Detroit, or *write* F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Multispindle Drill Heads Separately Powered

A MULTISPINDLE drill, the Versi-Matic, has heads that revolve 360 degrees horizontally and vertically, on or under the worktable. Equivalent in size and power to a conventional 17 to 20 in. drill press, it performs as a special purpose machine for continuous runs. The maker also says it can easily be rearranged to meet job requirements.

Each head is individually powered and can be operated automatically or manually. Spindles operate in sequence as well as simultaneously. The unit accepts standard drill attachments, including a multidrill head.



For further information, *write* Van Norman Machine Co., a division of Van Norman Industries Inc., 3640 Main St., Springfield 7, Mass.

Tig Holder Air Controlled

A 160 AMPERE, manual, tungsten inert gas (heliweld) holder is equipped with a thumb operated gas valve for speed and economy. The unit is air cooled.

Suitable for welding thin gage aluminum, stainless, copper, magnesium, killed steel, and other specials

and alloys, the holder (H16-B Heliweld) can be applied in automotive, nuclear, and fabrication operations. The 2⅞ in. head clearance permits use of the unit in confined spaces. A variety of nozzle orifice sizes and accessories are available. The manufacturer says the holder has minimum stub loss, efficient gas shielding, and no high frequency leakage.

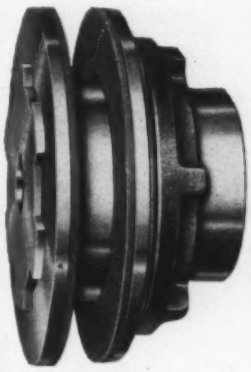
For further information, *write* Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Ultrasonics Employed to Clean Grinding Wheel

DESIGNED to improve performance and grinding wheel life, an ultrasonic device, the Cavitron Ever-Grind, speeds production by reducing excessive wheel loading (it cuts downtime for frequent dressing).

Because buildup of particles is prevented, finer and harder wheels can be used to produce finer surface

A Morse answer



Torque limiters

...when the problem involves automatic overload protection

Protect expensive equipment
Eliminate shear pins
Lessen costly downtime
Adaptable to any drive
Easily adjusted
Controlled torque setting
Capacities: 10 to 6300 ft.-lbs.
Clutch sizes: 3 to 20 inches
Distributor-stocked

Got a clutch problem? Call your Morse distributor. He's listed in the Yellow Pages.

MORSE
A BORG-WARNER INDUSTRY
BW

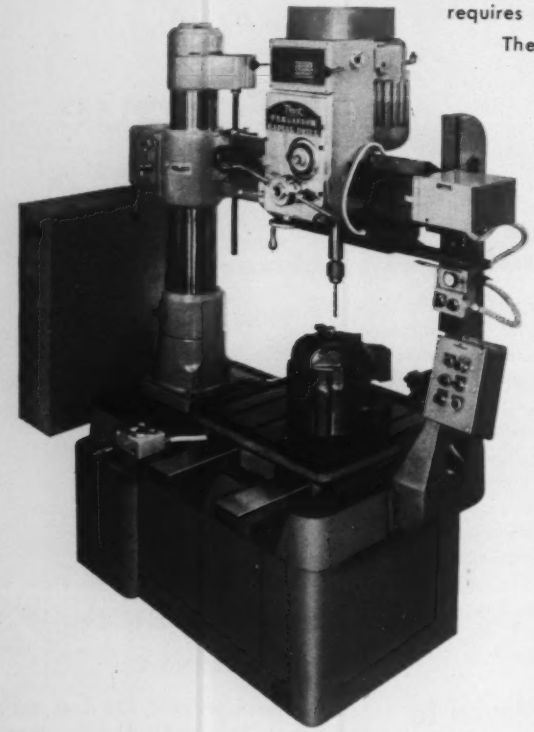
Morse Chain Co., Dept. 2-91, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

SINGER*

NUMERICAL CONTROL

BUY THE COMPLETE PACKAGE...

FOR THE O.E.M. . . . SINGER Numerical Control . . . the most direct approach to point-to-point positioning . . . offers speed, capacity, versatility, a high degree of accuracy . . . and is available at a low initial investment. The system is sold as a package, complete and ready for installation, including the tape reader. It requires only the measuring bars to suit the specific machine. The SINGER system offers a high degree of accuracy, for drilling, jig boring or milling . . . ±.001 inches on a work table and up to 40 inches of travel.



...OR THE COMPONENTS

For the buyer who wants to acquaint himself with the advantages of automatic positioning, rather than buy a complete package, the SINGER system is ideal. Because of SINGER'S modular design, a machine can be furnished with the automatic positioning system only. At a later date, tape control can be readily added with no sacrifice of the original investment. It is important to know, too, that all modules and motors are designed, serviced and built by Diehl Manufacturing Company, a SINGER subsidiary. Call or write for an appointment at the address below.

Shown here is SINGER Numerical Control applied to the new Veetmatic Precision Drilling Machine. This electrically-operated system provides more economical operation at greater accuracies than conventional layout drilling procedures.

Diehl†

DIEHL MANUFACTURING COMPANY

SUBSIDIARY OF THE SINGER MANUFACTURING COMPANY

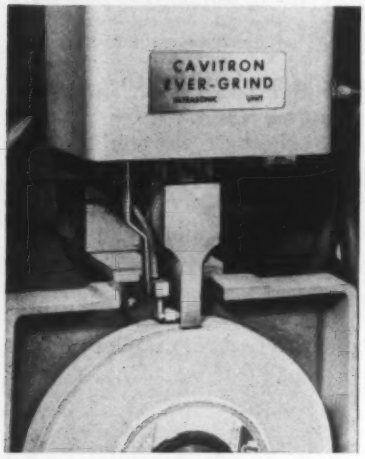
Finderne Plant, Somerville, New Jersey

Telephone: Randolph 5-2200

*A Trademark of THE SINGER MANUFACTURING COMPANY

†A Trademark of THE DIEHL MANUFACTURING COMPANY

NEW PRODUCTS and equipment



finishes and greater dimensional accuracy with a minimum of burning and work deterioration (even on difficult to grind metals), says the manufacturer.

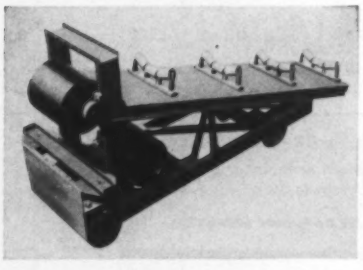
Operation: An aluminum tool, attached to the end of a magnetostrictive transducer is positioned close to the grinding wheel surface. As coolant is passed through the tool and onto the wheel surface, cavitation is induced within the liquid to cool and clean the grinding wheel.

For further information, *write* Cavitron Equipment Corp., 51-02 21st St., Long Island City 1, N. Y.

Tripper Discharges Flow From Conveyor Systems

YOU CAN use the Finco cable propelled tripper in installations where a power propelled tripper is required, but where electrical conductors or trolley wires can't be applied. The unit permits discharge of material to points along the length of a conveyor system.

The belt tripper shown weighs 5500 lb. A 36 in. wide belt permits high capacity stockpiling. The unit is 18 ft long, 4½ ft wide, and 7 ft high. It is track mounted.



A single wire rope reeved through the tripper and a stationary sheave, and driven by a winding machine governs forward or reverse movement. Travel is about 30 ft per minute.

For further information, *write* Finco Inc., Aurora, Ill.

Testing Devices Announced

DEVELOPMENTS from Magnaflux include an eddy current instrument for automatic testing of electric weld tubing and buttweld pipe; a compact, 900 ampere magnetic particle test unit; an eddy current crack detection and sorting unit; a transistorized magnetometer; and instant mixing concentrates for magnetic particle testing.

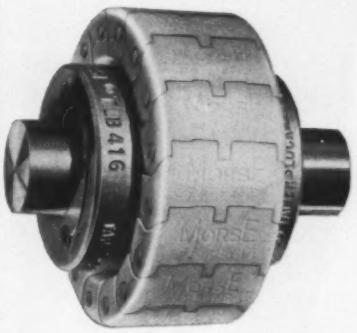
The eddy current system, the Magnatest SD-100, offers mill speed testing of electric weld tubing from ¼ to 2½ in. OD and buttweld pipe from ½ to 4 in. OD. Controls, sensing elements, and readout and marking devices are designed to eliminate human error or operator judgment.

The 900 ampere magnetic particle test unit is a compact. It can be squeezed through narrow openings to test almost inaccessible areas. It has a dual output of 900 magnetizing amperes ac or half-wave dc. Operation is from 220/440 volts, 60 cycle, single phase. Weight is 70 lb.

The Magnatest ED-600 is a fixed frequency, eddy current instrument designed to locate and determine the relative severity of cracks in nonmagnetic materials. Other applications include sorting nonmagnetic metals according to conductivity or alloy variation, and thickness measurement of conductive and nonconductive coatings. A feature of the probe design is lift-off or intermediate layer compensation which reduces spurious meter deflections due to probe positioning, surface roughness, dirt, oxide, or pits.

The FM - 610 Magnetometer/Gradiometer for measuring dc magnetic fields is transistorized. Using the field probe, measurements can be made in the range of 5 to 1000

A Morse answer



Nylon couplings

... when the problem involves corrosion, cost, lubrication

Corrosion-resistant
Cost 20% less
Lubrication-free
Safety first
Easy disassembly
Standard stock sprockets
Fractional to 40-hp. loads
Speeds up to 5,000 rpm.
Distributor-stocked

Got a coupling problem? Call your Morse distributor. He's listed in the Yellow Pages.

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Morse Chain Co., Dept. 2-91, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

CHICAGO STEEL SERVICE COMPANY

Kildare Avenue at 45th Street, Chicago 32, Illinois
Mailing Address: Box 6308, Chicago 80, Illinois

ARE you getting full return on your purchasing dollar if it just buys raw materials?

We believe you are entitled to something more.

Beyond prompt delivery of your order, our service includes *complete* metallurgical assistance backed up by more than 30 years of specialization on stainless steel commodities.

Here are a few every-day examples of this plus service in action:

Helping a Minneapolis appliance manufacturer eliminate production problems in adapting stainless steel tri-ply to the finished cooking surface of their new grille.

Helping a Rockford fabricator in designing production dies and selecting proper drawing lubricants for production of an intricate one-piece diaphragm housing.

Helping a Wisconsin fabricator with the selection of the most economical grade of stainless to meet the demands of government specifications on a part for military equipment. Assistance continued in areas such as tool design and welding procedures.

Services like these cost you nothing extra at the House of Stainless. As for stocks, we maintain the most complete and diversified stainless inventory available.

Remember, too, our connections with the leading stainless producers enable us to supply any size, type or quantity of stainless material to meet your requirements.

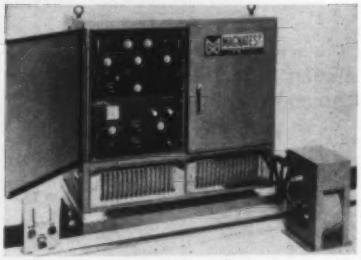
Just phone LAfayette 3-7210

Milwaukee District Office: 757 N. Broadway, Milwaukee 2, Wisc. Telephone BRoadway 3-7874
Sales Representatives at Bloomington and Rockford, Ill.; Indianapolis and South Bend, Ind.; Davenport, Iowa; Grand Rapids, Mich., Minneapolis, Minn.; Appleton and Wausau, Wisc.

YOUR DEPENDABLE SOURCE FOR CARBON AND STAINLESS STEEL; ALSO INCO ALLOY BAR, WIRE AND STRIP

millioersteds. Ten to 2000 millioersted measurements can be made with the gradient probe.

Materials called concentrates (in powdered form) are said to be superior to previous Magnaflux and Magnaglo pastes. Advantages include easier mixing, handling, storage, a measurable increase in fluorescent brilliance from 70 to 600 per cent, closely controlled particle size range, less foaming, and more corrosion protection.



Eddy current instrument automatically checks electric weld tubing and butt-weld pipe

See them at Booth 368, National Metal Exposition, Cobo Hall, Detroit, or *write* Magnaflux Corp., a subsidiary of General Mills, 7300 W. Lawrence Ave., Chicago 31, Ill.

Electric Hoist Models Rated from 1 to 3 Tons

SPEEDWAY electric hoist models having capacities from 1 to 3 tons with single, two speed, or variable speed controls have been added by Wright Hoist. You can get lug or base mounting, plain, geared, or motorized trolleys, and two or four part reeving. Capacities of 1 to 2 tons are available for close headroom applications. An overload cutoff can be obtained for protection of operator, load, and hoist.

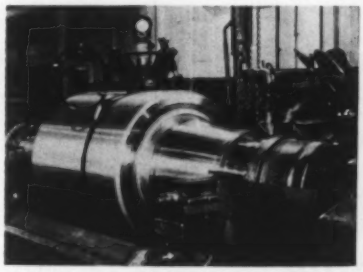
The enclosed motors (ball bearing type) are built to NEMA specifications and rated on a basis of a 30 minute duty cycle.

For further information, *write* Wright Hoist Div., American Chain & Cable Co. Inc., 735 Hay St., York, Pa.

Device Checks Cylindrical Parts for Hardness

CYLINDRICAL pieces with diameters from 12 to 36 in. can be tested for hardness with the Wilson M V tester. Portability makes the unit especially useful for checking large, heavy pieces that are difficult or impossible to move.

See it at Booth 952, National Metal Exposition, Cobo Hall, Detroit, or *write* Wilson Mechanical Instrument Div., American Chain & Cable Co. Inc., 230 Park Ave., New York, N. Y.

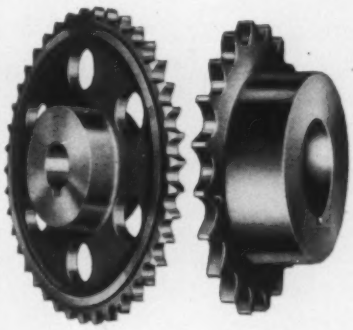


Unit Stores and Releases Energy for Spotwelding

A POWER supply that stores and releases precise welding energy of 20 to 225 watt-seconds permits 50 to 120 spotwelds a minute. The unit (Raytheon Weldpower Model 225B) stores and discharges the same amount of power for each weld regardless of normal line voltage fluctuations.

By accumulating energy within 0.5 to 1 second after each weld and then discharging it in a pulse of a few milliseconds, the supply tends to eliminate burning or oxidation

A Morse answer



roller chain sprockets

...when the problem involves quality, cost and performance

Made to A.S.A. standards

Chain-maker quality

Precision pitch control

Controlled concentricity of bore, hub, and teeth

Advanced heat-treating processes

Face runout minimized by exclusive flattening process

Distributor-stocked

Got a sprocket problem? Call your Morse distributor. He's listed in the Yellow Pages.

MORSE

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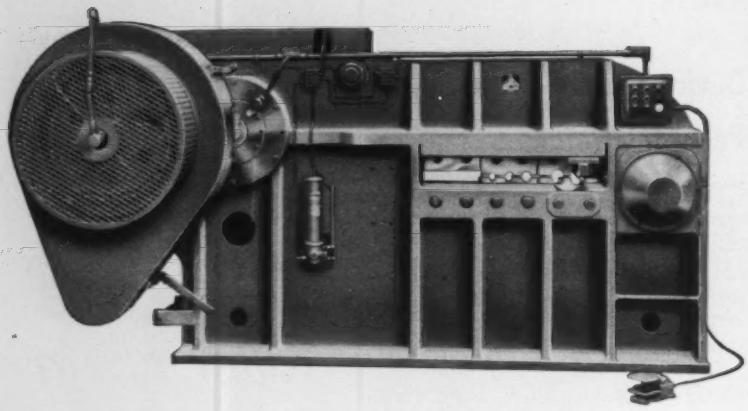
BW

Morse Chain Co., Dept. 2-91, Ithaca, N.Y. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ont.

popular size

HILL ACME Bar-Billet Shear

cuts rounds, squares and flats without knife change



simple, rugged design

The Model 500 HILL ACME Bar-Billet shear has cutting capacity of 4½" in rounds or 4" in square mild steel. The basic principle of lever and fulcrum is employed for maximum efficiency with low power input.

versatile

With free running speed of 35 cuts per minute, high production is assured. The 36" knife permits cutting of rounds, flats, etc. without knife change. All models are available with fully automatic, semi-automatic or hand feed.

size range

HILL ACME Bar-Billet shears are made in a range of sizes to efficiently accommodate every commercial requirement. Bulletin BB-61 gives complete details.

The HILL ACME Company

Also Manufacturers of:

"CANTON" ALLIGATOR SHEARS • "HILL" HYDRAULIC SURFACE GRINDERS • "ACME" FORGING MACHINES • "CLEVELAND" KNIVES • MECHANICAL LIFTERS • "KLING" METAL WORKING MACHINERY

1201 WEST 65th ST., CLEVELAND 2, O.

NEW PRODUCTS and equipment

of electrode tips and workpiece. It welds ferrous, nonferrous, and dissimilar metals of high electrical and thermal conductivity.

For further information, *write* Commercial Apparatus & Systems Div., Raytheon Co., 225 Crescent St., Waltham 54, Mass.

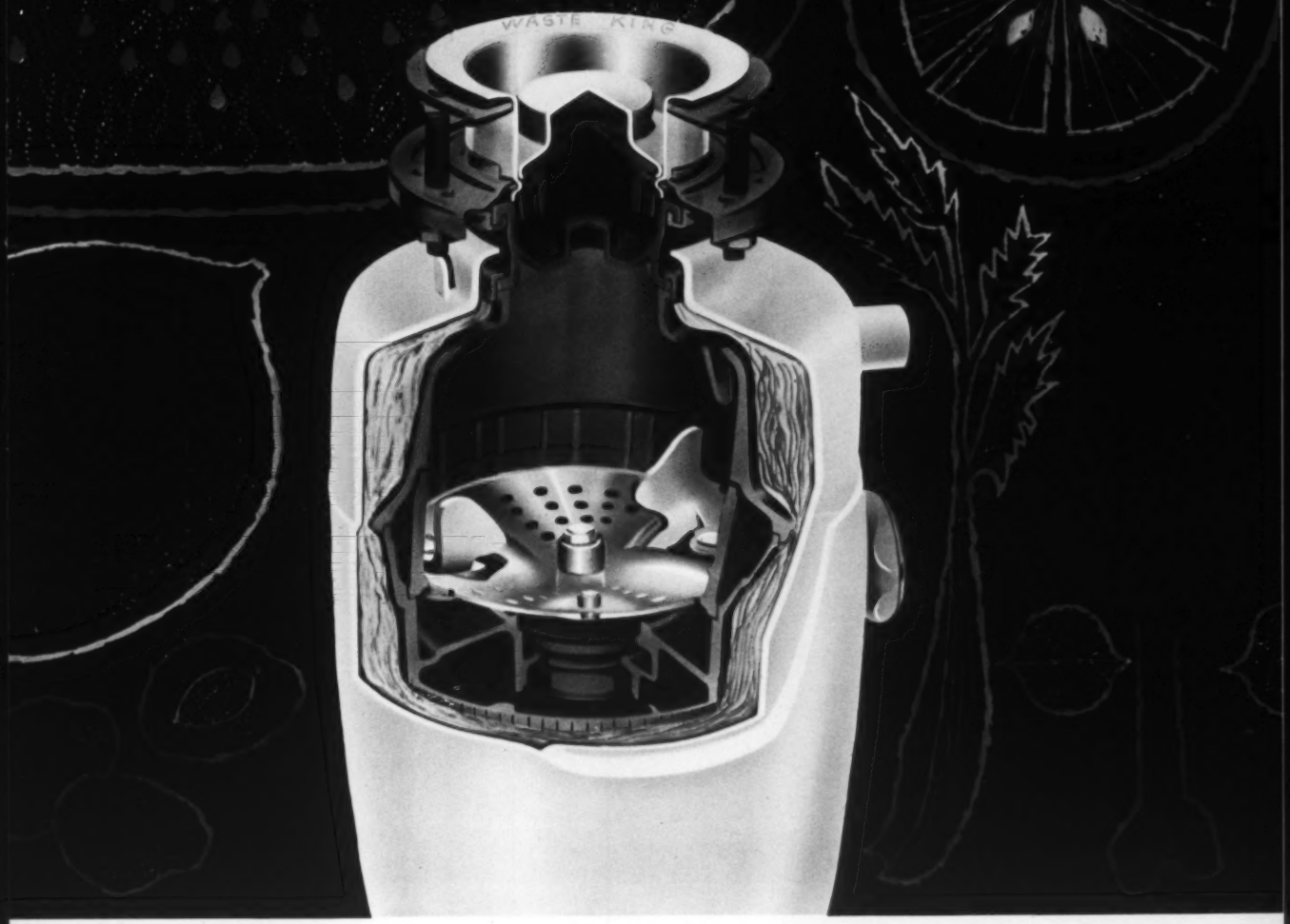
Motors, Generators Have Aluminum Heat Exchangers

AN ALUMINUM air to air heat exchanger design is featured on totally enclosed dc motors (Life-Line H) in ratings from 75 to 250 hp at 1150 rpm. Generators in corresponding ratings are also available.

A totally enclosed ac motor drives the blowers. To reduce over-all height, the blower motor is recessed in the dc motor commutator bracket.

For further information, *write* Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

For the most severe functional application in the home



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CARNEGIE, PENNSYLVANIA
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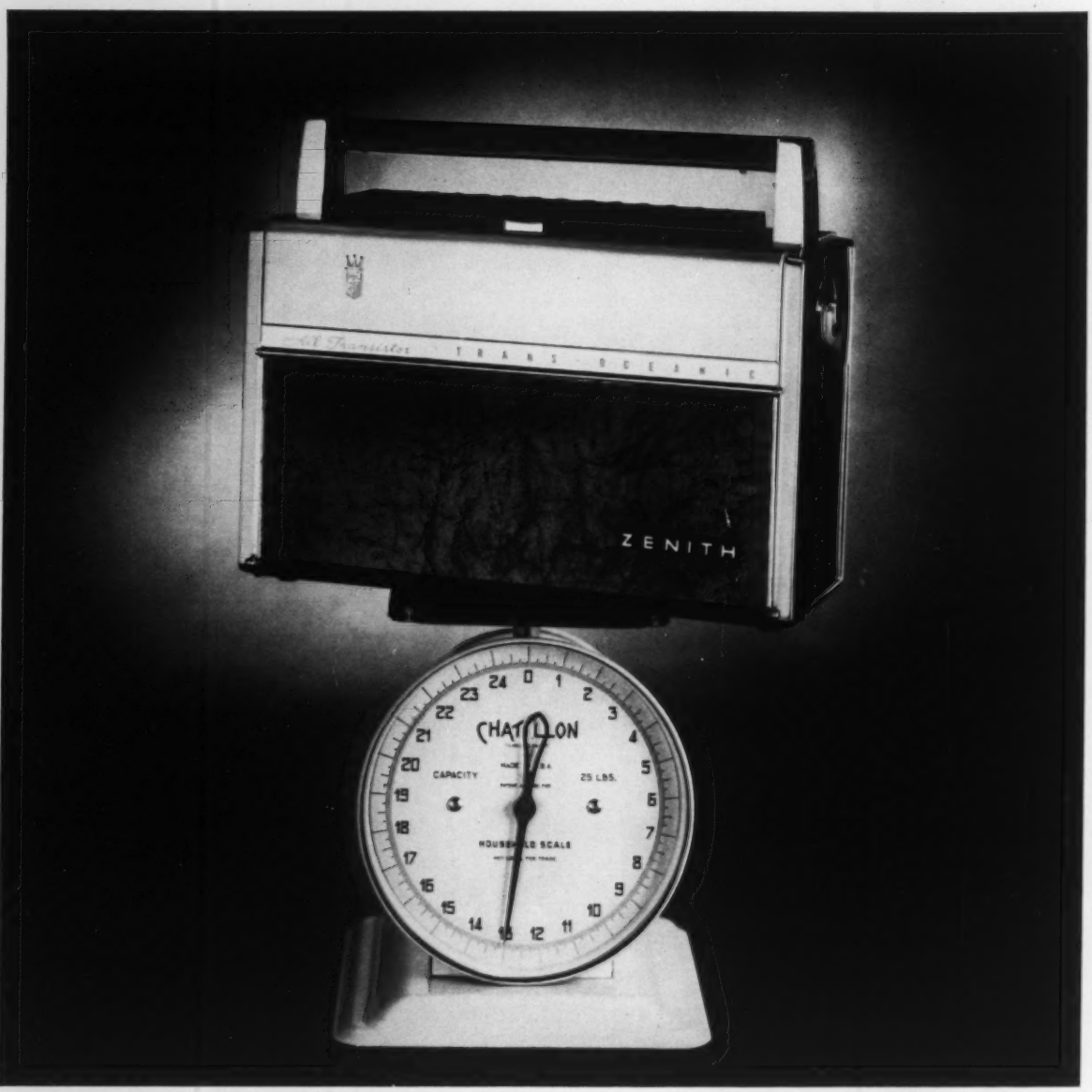
Stainless Steel



ASSIGNMENT: A weighty one. Take the Zenith Royal 1000 Transoceanic portable radio and pare off half of its 26 pounds—without reducing performance. How do you do it? With an aluminum case? No. With plastics? No. You do it with a housing made from eleven thin-wall, high strength zinc die castings. You do it with the only material and method that can provide the "as cast" tolerances necessary for the flush-fit the design demands. You rely on a material that can be cast thinner, and yet stronger, than any die casting competitor; a material whose castability permits shapes and intricate sections prohibitively expensive by other fabricating techniques. You know that assembly will be easy, because you can use self-tapping screws, and speed nuts on the cast bosses. You know that finishing will be a pleasure, with a smooth surface that readily accepts bright, satin and brush-finish chrome plate, as well as paint to fill the cast lettering. We could go on and on, detailing the advantages each one of the eleven zinc die castings demonstrates, pointing out the skillful designing that combines a multitude of functional and decorative duties. However, all you need do is look at the scales above and remember—zinc die casting gives you more for less. How else would you make it?

Zinc die castings by Paragon Die Casting Company, Chicago, Illinois.

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NEW literature

Write directly to the company for a copy

Efficient Spring Assembly

A guide to lower assembly costs in equipment using springs is contained in a 16 page bulletin. Associated Spring Corp., Bristol, Conn.

Conveyor Belt Engineering

Need aid in the engineering and selection of belt conveyors? Data accumulated by Pennsylvania State University as the result of a study grant from Hewitt-Robins is presented in Bulletin 175. Dept. CBE, Hewitt-Robbins Inc., Stamford, Conn.

Silicone Based Finishes

Descriptions of silicone based industrial finishes and their capabilities are presented in a Bulletin CDS-294. Silicone Products Dept., General Electric Co., Waterford, N. Y.

Ideas for Packing, Shipping

Tips, ideas, and suggestions for shippers are included in an idea booklet. It includes chapters on safety, savings, product protection, proper maintenance of equipment and lists, and new packing and shipping techniques. Better Packages Inc., Shelton, Conn.

High Permeability Alloys

A booklet on high permeability magnetic metals contains material on permeability and core loss of Carpenter High Permeability "49" and HyMu "80" alloys at both 60 and 400 cycles. The preface contains a section describing the selection and use of test methods, magnetic behavior of metals, and the various alloys tested. Magnetic Metals Co., Hayes Avenue at 21st Street, Camden, N. J.

Magnesium Specifications

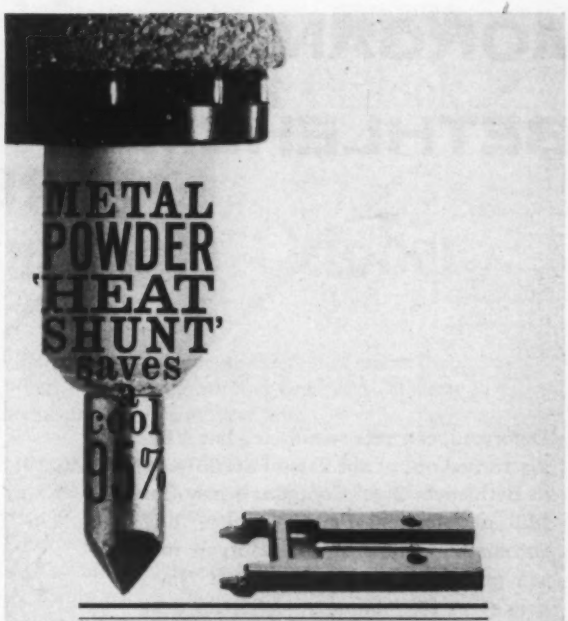
A revised bulletin, *Digest of Magnesium Specifications*, provides a listing and brief description of specifications issued by government procurement agencies and technical societies. Dow Metal Products Co., a division of Dow Chemical Co., Midland, Mich.

Silicone Rubber

A 60 page book on silicone rubber is intended to serve as a text and reference for designers and also to provide an interesting study and guide for nontechnical personnel. Mechanical Rubber Products Co., Warwick, N. Y.

Gear Tooth Spacing

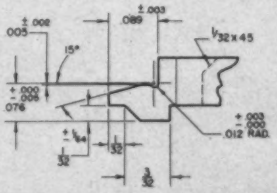
A checking system intended to simplify the analysis of gear and spline tooth spacing errors is described in Data Sheet 1132. Eccentricity and index errors are separated by graphic means for straight or helical gears or splines. Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.



The heat shunt shown above is pressed from pre-alloyed bronze powder and hard-chrome plated. It is used to position electronic components on printed circuit boards and eliminate heat damage when soldering.

Design teamwork between Kwikset Powdered Metal Products and Autonetics Division of North American Aviation has resulted in a part which is produced at a 95% cost saving over previous machining methods.

The heat shunt is easily produced in four precise end modifications to locate components at various angles. When soldering,



the high heat conductivity of the bronze protects the components and circuit from melting by drawing off heat produced at the solder joint. The heat shunt itself is solderproof thanks to its hard-chrome plate.

This time-saving printed circuit tool demonstrates that, working together, the metal powder fabricator and his customer can lick the hottest problem. To find out how to put nonferrous powder metallurgy to work for you, write today to the New Jersey Zinc Company, producers of nonferrous metal powders setting tomorrow's standards today.

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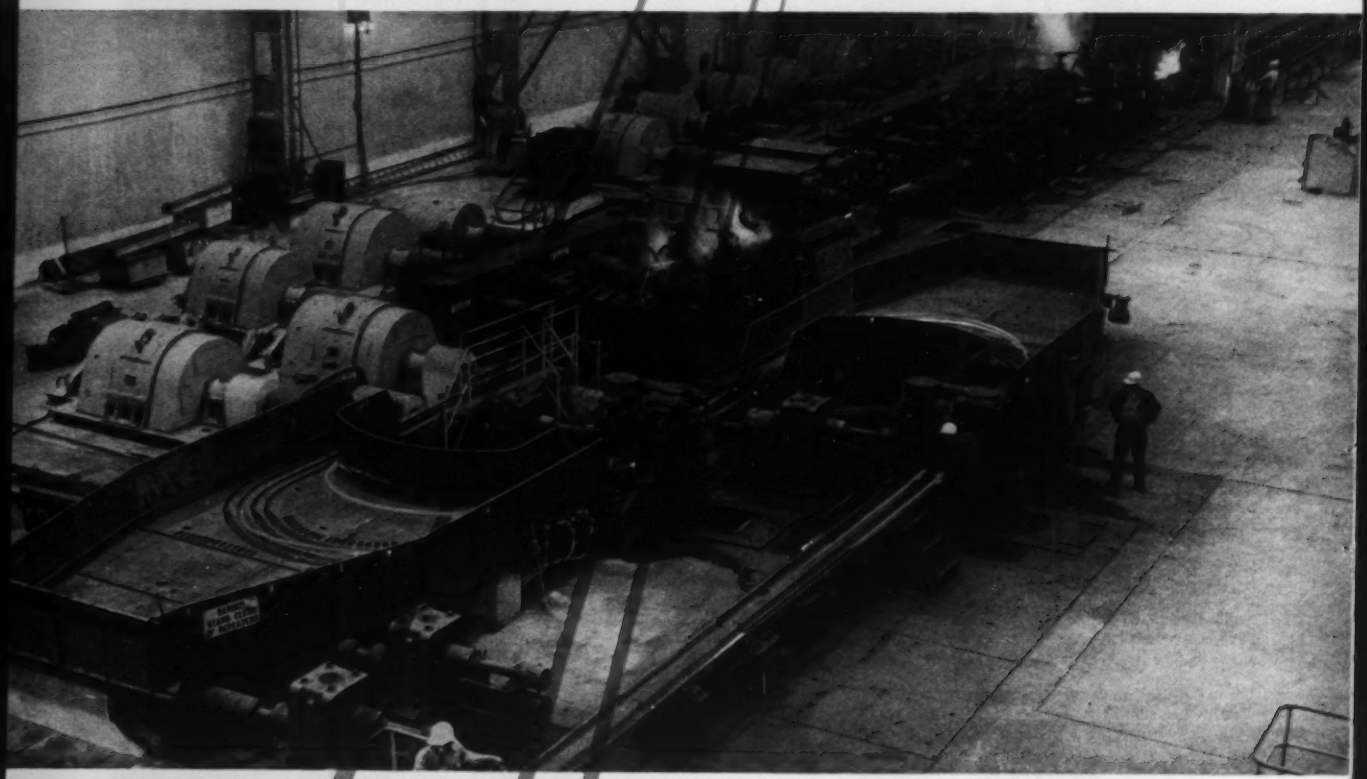
Deformed, concrete reinforcing bar is being turned out at the rate of 2600 f.p.m. in Bethlehem Steel Company's new Bar Mill at Steelton, Pa. This new, fully automatic, double strand Morgan mill can produce a five-ton bundle of No. 3 bars every 10½ minutes—operating data which underscore Morgan's world-recognized engineering ability to design mills that meet the current market demand.



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Strikes Push Upturn into October

AUTO INDUSTRY strikes are scuttling steelmakers' hopes that third quarter ingot production would be substantially higher than that of the second quarter.

This week's output will be about the same as the 2,040,000 ingot tons that STEEL estimates the industry poured in the week ended Sept. 23. Production then was 0.4 per cent above the previous week's, but it was well below the level that might have been expected if labor strife hadn't crippled so many key plants of General Motors Corp.

GM's suppliers have managed to keep their production up by storing finished steel and giving priority to new orders from other customers. But they haven't been able to move ahead. Result: Ingot production in September will be about the same as August's 8,657,000 tons. Third quarter production will be about 25.4 million tons—only slightly higher than the second quarter's 25.1 million tons.

NOT MUCH HEDGING— There's little likelihood that the recent pickup in shipments to nonautomotive customers will be large enough to offset September shipping losses caused by the GM strikes. Nor is there much chance that price hedging will take up the slack. Relatively few orders that have been received recently specify that shipment must be made before Oct. 1, the date when steel labor costs will go up again.

Some buyers think government opposition will at least force steelmakers to delay raising prices until the controversy cools and the market strengthens. Many companies that have decided against hedging expect action on a selective basis during the fall or winter, but they don't think it's worthwhile to tie up their money when the price increases may be weeks or months away.

OCTOBER UPTURN SEEN— Although orders for October are running a little behind those that were on the books a month ago for September, steelmakers are confident that next month will be their best since April, 1960. They attribute the market's lethargy to side effects of the auto labor hassle. Once that's cleared up, they expect all their customers to step up their buying. Automakers will take steel that was originally slated for September shipment and order more. Nonautomotive accounts will start building inventories in anticipation of higher production. Look for ingot production of more than 9 million tons next month and finished steel shipments of at least 6.5 million tons.

DELIVERIES LENGTHENING— Demand for plates and wide flange beams is accelerating. September shipments will exceed August's, and bookings for October are running slightly ahead of September's. Delivery promises for wide and heavy plates are lengthening at Midwestern mills. At Pittsburgh, a 160 in. mill is booked into mid-October. At Gary, Ind., deliveries from a comparable mill are being quoted at six to eight weeks (vs. three to four weeks in August). Producers warn that some customers may be caught short if they don't start planning now.

OUTLOOK FOR NEXT YEAR— Look for a 10 to 15 per cent rise in the steel industry's production next year, says William P. Carlin, director of economics, Republic Steel Corp. He forecasts output of 110 million to 115 million ingot tons, with the bulk of it in the first half. Consumption will be at a good level, then, he believes, and users will be building inventories against the possibility of a midyear strike.

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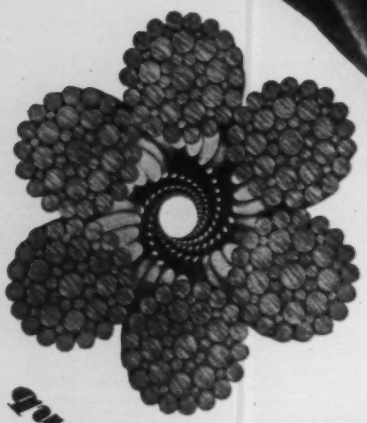
*Current prices were published in the Sept. 18 issue and will appear in subsequent issues.

We put a lot of work into it — You get a lot of work out of it



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Zirconium producers face . . .

Problems of a One Market Metal

ATOMIC ENERGY holds the key to the future of zirconium. Despite attempts to find new markets, the zirconium industry is wedded to the atom for the foreseeable future.

Such reliance on atomic energy makes an accurate appraisal of zirconium's prospects difficult, even by those whose job it is to forecast markets. The problem is this: The nuclear energy industry is still in its infancy in terms of size and development. Only a handful of commercial power reactors have been built, and none is anywhere near being competitive with conventional powerplants. The Navy's atomic submarines have been the biggest market for the metal, but how big a fleet will be built is still uncertain, and orders for research reactors are sporadic.

• **Key to Atomic Market**—How fast atomic energy develops is one key to zirconium's future. Another is what direction reactor development takes. Most reactors in use are of the pressurized water type. Zirconium is used in them because of its high neutron economy, strength, and corrosion resistance at medium temperatures. The applications: Certain structural members and cladding for nuclear fuel elements. A lot of work is being done on reactor systems that operate at higher temperatures. If there's a shift to them, zirconium people could be hurt.

• **On Plus Side**—It's generally believed that water reactors will continue to dominate the reactor market for at least 20 years. Some observers estimate that by 1970 they will be producing power that is competitive with coal in some sections of the country.

Zirconium reactor elements are withstanding temperatures of 600° F. Alloy development may raise the figure significantly. A columbium-zirconium reactor alloy is possible.

The Navy will probably continue to use the pressurized water reactor system in atomic subs and surface vessels, which would be a big boost for zirconium. Another possibility: Zirconium may be used for replacement elements in reactors originally designed for stainless steel. A move to more highly enriched fuels where neutron economy becomes more important would also aid zirconium.

• **Looking for Breakthrough**—Outside of reactors, there is little demand for zirconium.

Some people contend that there are few things zirconium can do that stainless steel or titanium can't do better. But industry people say areas exist where zirconium is the best material for the job. So far such uses are more potential than actual. Probably the best prospect, although it's still a small market, is in chemical processing equipment for specialized jobs (tanks, heat exchangers, valves, tubing, pumps). Processes that require strong hydrochloric and sulfuric acid environments are examples.

• **Other Markets** — Zirconium has won a good chunk of the flashbulb market. It is being studied as a fuel additive in the second stage of solid fuel rockets. It's a minor alloying element in refractory metals and a key material in the superconductive metals being developed. It's also found in certain ferroalloys.

• **Fabrication a Problem**—Zirconium is more difficult than the more commonly used metals to fabricate, but it doesn't present nearly the problems the refractory metals do. What worries producers more: Because of the limited demand for the metal, there has been a lack of interest among fabricators in learning how to work it—which has contributed to keeping prices high and limiting available shapes.

• **Four Producers**—Zirconium metal is being produced by four companies: Carborundum Metals Co., a division of Carborundum Co.; Wah Chang Corp.; Reactive Metals Inc., a division of National Distillers & Chemical Corp.; and Columbia-National Corp., a division of Pittsburgh Plate Glass Co. They have the capacity to produce about 6.5 million lb of zirconium annually.

Demand isn't nearly that big. Because virtually all the production of three producers goes to the Atomic Energy Commission, consumption figures are classified.

Production last year hit 2.8 million lb, and it's running about the same this year. Consumption is somewhat less—probably around 2 million lb, believe some industry people.

• **Reserves Good**—If demand were to jump, supply would be no problem. Enough metal is contained in U. S. zircon sands (mainly found in Florida) to supply U. S. industry for 150 years at the present rate of production. Several other Free World nations, principally Australia, where U. S. producers are getting

SUNBEAM electric heater cases get uniform finish with RANSBURG electrostatic. . . . 6 times as many per gallon of paint—15 times faster.

"Paint Mileage Leaps 500%.... Production Upped 15 Times" Reports ENAMELED STEEL & SIGN CO.

Curt Simmons, President, ENAMELED STEEL & SIGN COMPANY of Chicago, describes results with RANSBURG Automatic No. 2 Process Electro-Spray: "We first painted cases for the new SUNBEAM portable electric heaters with air hand spray at the rate of 200 pieces per day using 6 gallons of paint. Now, with RANSBURG electrostatic we've increased production 1400% to 3000 pieces daily with only 15 gallons of paint." An increase of 500% in paint mileage! *What would savings like this mean in your finishing department?*

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Sags and runs, a problem with the air hand spray, have been eliminated with the automatic electrostatic equipment. Mr. Simmons adds: "Now we achieve a uniformity over the configurated area which wasn't always possible before. We know the 50,000th piece will turn out the same as the first."

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Manufacturers—large and small—are reporting similar savings in paint and labor with increased production. If your volume doesn't justify automatic electrostatic equipment, perhaps the RANSBURG electrostatic hand gun will help cut costs in your finishing operation. Write for our new brochure showing actual in-plant production photos, savings figures and detailed information on RANSBURG No. 2 Process Electro-Spray.

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a large chunk of their supply, have hefty deposits.

• **Prices on Plateau** — Prices run $6.25 to $7.75 a pound for reactor grade sponge (depending on quantity) and around $11 to $16 a pound for standard mill shapes. It's unlikely that producer prices will be changed any time soon because of the small quantities produced and the expensive processes required in separating hafnium from the zirconium. It's possible that prices of mill products and finished zirconium parts may come down.

Some Steel Shipments Are Held Up in Carla's Wake

Steelmaking operations are back to normal in Texas after the hurricane Carla, but shipments of steel to consumers in the most severely storm-ravaged areas have been delayed. The Sheffield steel mill at Houston suffered only light damage. Operations were slowed down for four days. Most industrial plants along the Texas Gulf Coast rode out the storm in good shape.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 191 & 192

Sheetmakers have received hold-ups on shipments to General Motors' plants, but most of them are continuing to maintain rolling schedules; they are holding the rolled material for storage, figuring the auto strike will be short-lived and that the steel will be needed quickly when car assembly is resumed. Production will be affected severely should the strike be prolonged since mill storage space is limited.

Despite the automotive difficulty, sheet buying is being fairly well sustained by miscellaneous consumers. In general, deliveries are unchanged from those quoted in recent weeks.

Tool Steel . . .

Tool Steel Prices, Page 196

Shipments of tool steels (excluding hollow drill steel) in July totaled 4848 net tons, reports the American Iron & Steel Institute. June shipments were 6912 tons vs. 4684 tons in July, 1960.

The tonnage moved in the first seven months this year was off substantially from that in the like

1960 period, totaling 43,622 tons vs. 57,933.

Farm Equipment Builders' Views on Outlook Mixed

The more optimistic farm equipment makers expect sales increases ranging up to 10 per cent this year. The Northwest drought and government acreage restrictions of feed grains have hurt business. Those opinions were expressed at the Farm Equipment Institute convention in Chicago.

Allis-Chalmers Mfg. Co. has laid off about three-fourths of its employees at the LaPorte, Ind., plant which makes farm machinery. Furloughed indefinitely are about 500 production employees and 400 clerical office and supervisory workers. Production will not be resumed until the manufacture of machinery for sale next year can be started, possibly late in December, or early in 1962.

The plant produces grain, hay, corn, and forage harvesting machinery, mowers, and cotton pickers. Those products are seasonal in character. However, company officials state that demand for pull-type machines, contrasted with self-propelled types made at the company's Independence, Mo., plant, has been declining for several years, and inventory of finished machines is adequate to meet present demands.

Wire . . .

Wire Prices, Pages 192 & 195

Most wire products are available for relatively prompt shipment. Merchant wire can be had from stock, and manufacturers' wire shipments are being promised in a week to five weeks, depending on processing required.

Tubular Goods . . .

Tubular Goods Prices, Page 196

The general improvement in oil industry operations this year has helped Texas steel mills to reach near-capacity levels. A spokesman for the Houston mill says the increase in rotary rig operations this year has had a marked effect on demand for tubular goods.

Hughes Tool Co.'s latest survey shows active rotary drilling rigs in

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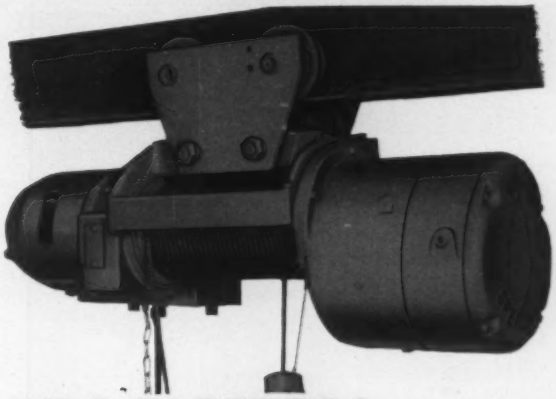
a New Member of the Wright Speedway Hoist Family...



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The W-1 Speedway is a hoist it will pay you to meet without delay. Completely new in design, it can be tailor-made to your exact job requirements for high handling efficiency, low maintenance costs and longer service life. You can choose the W-1 in capacities from 1 to 3 tons...with single, two-speed or variable speed controls... lug or base mounting; plain, geared or motorized trolleys...two or four part reeving. For close headroom application, the WH-1 is available in capacities of 1 to 2 tons. Both models can be equipped with Wright's own built-in overload cut-off for 3-way protection of operator, load and hoist. Hoists are factory tested at 50% above rated capacity before overload equipment is installed.

OTHER W-1 SPEEDWAY FEATURES

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Bearings—Anti-friction, precision ball or roller bearings support both ends of all shafts. They are mounted in splash oil lubricated gear chamber.

Motor Brake—External expanding jaw, self-adjusting cam type; operated by solenoid.

Drum—Fabricated all-steel construction with liberal drum to cable diameter ratio to reduce wear and cable fatigue.

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this country and Canada totaled 1998 in the week ended Sept. 12, down 43 from the preceding week.

Shipments Stretching Out At Midwestern Mill

An extension of steel mill deliveries is reflected in the delivery promises of a large Midwestern producer. It now quotes: Universal mill plates and 24 in. mill flats at two to three weeks vs. one to two recently; sheared plates (heavy and wide) four to five weeks vs. three to four; light sheared plates two to three weeks.

Hot rolled sheets, hot rolled pickled sheets and coils, hot rolled strip and hot rolled pickled strip continue to be available in two to three weeks. Cold rolled sheets and coils, however, have moved from three to four weeks to four to five, and enameling sheets and coils from three to four to three to five. Electrical sheets and coils are unchanged at three to four weeks.

Galvanized sheets and coils and culvert sheets reflect little change at late October and early November. Still available for October delivery are electrolytic tin plate coils and sheets, black plate, and blue plate.

Steel Bars . . .

Bar Prices, Page 190

Hot rolled carbon bar business is a shade better, but demand is spotty. The same can be said for cold drawn bars. Stainless bars are moving faster than they were earlier this month, reflecting increased defense activities.

In the Midwest, hot rolled bars are still on a short leadtime basis. One area producer reports order volume is so heavy that he will not interrupt rolling schedules to take care of rush orders.

Bethlehem Steel Co. plans to install two, new bar mills at its Johnstown (Pa.) plant. The expansion includes the renovation of a bar mill and billet mill. The mills are scheduled for completion in 1963. By then, Bethlehem will be able to furnish coiled products up to 2400 lb in coil weight and in sizes up to 1⅜ in. diameter.

The business hasn't felt the full impact of the automotive labor

trouble. There have been no order holdups or cancellations of significance. Barmakers are confident September shipments will be the best since May, 1960, if the auto strikes are quickly settled. Sales officials, however, don't expect deliveries to tighten materially until their operations climb above 80 per cent of capacity.

Some consumers are building inventory moderately in anticipation of better business and higher consumption, but only a few are hedging against the possibility of higher prices. Price speculators tip their hand by insisting that orders be shipped before Oct. 1. Those customers not hedging seem to expect price action on a selective basis this fall or early next year.

Universal-Cyclops Adding Sintered Molybdenum Line

Refractomet Div., Universal-Cyclops Steel Corp., Bridgeville, Pa., has added sintered, molybdenum mill products to its refractory metals product line. The company has been producing arc-cast molybdenum and its alloys the last five years and the expansion of the product line permits the company's complete coverage of practically all mill forms in both arc-cast and sintered product.

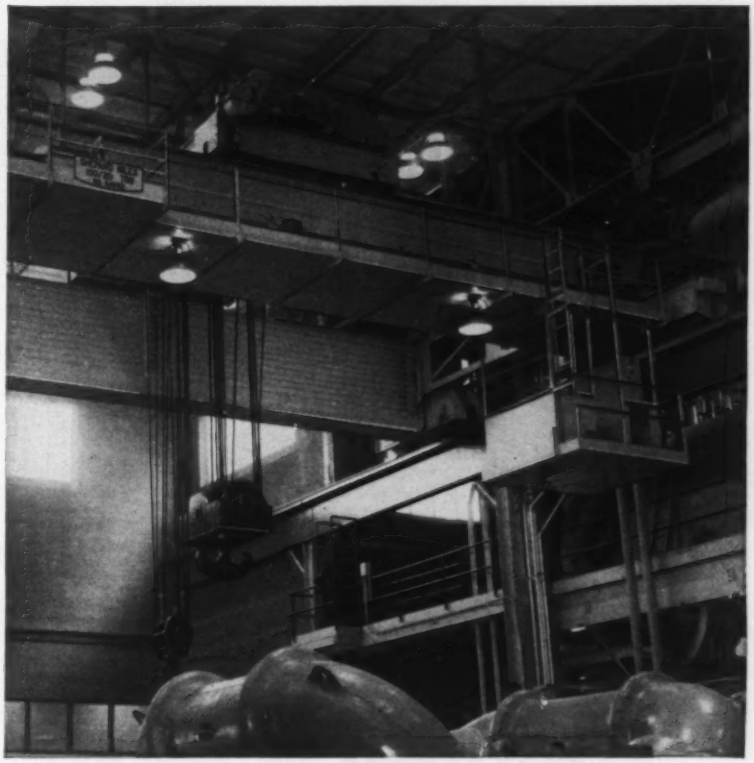
Arc-cast forms from forging billets through plates, sheets, bars, and wire are available from mill or warehouse. Sintered molybdenum products are now available in sheet in gages from 0.010 in. to 3/16 in., widths ranging up to 36 in. by random lengths; and bar products in diameters from 1/16 in. to 2 in. and random mill lengths up to 10 ft.

Plates . . .

Plate Prices, Page 190

While demand for plates has lost some of its recent acceleration, particularly in sheared and universal plates, ordering hasn't flattened out. September shipments will exceed August's by a small margin and will surpass those in any previous month this year. Bookings for October are running slightly ahead of September's.

More tonnage is being specified by distributors and tank fabricators,



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Shepard Niles JOB-MATED Cranes

Shepard Niles JOB-MATED Cranes, with auxiliary hoists, are not merely handling devices, but versatile, highly engineered machine tools that contribute directly to increased production and profits.

Even in our "standard" cranes, our use of Shepard Niles-designed and -built components results in your receiving a custom-built crane to meet your exact on-the-job conditions. Care like this in our plant means lower operating costs and increased efficiency in yours.

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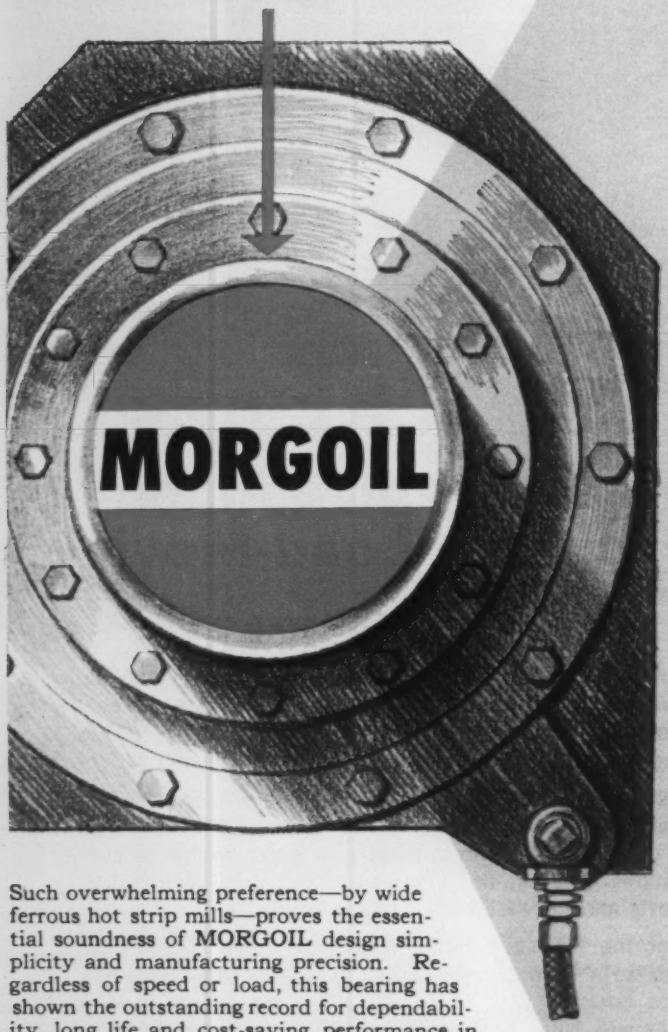
1172 Schuyler Ave., Montour Falls, N.Y.

28 MORE HOT STRIP MILLS SINCE 1955 HAVE GONE TO



ALGOMA STEEL
ALPINE MONTAN
AUGUST THYSSEN
COLVILLES
CRUCIBLE STEEL – MIDLAND
DOMINION FOUNDRIES & STEEL
DOMNARFVETS
FORD MOTOR COMPANY
FUJI IRON & STEEL
FUNDIDORA
GREAT LAKES STEEL
GUSTAVE BOEL
HINDUSTAN STEEL
KAWASAKI IRON & STEEL (2)
KLOECKNER WERKE
REPUBLIC STEEL – GADSDEN
REPUBLIC STEEL – WARREN
RICHARD, THOMAS & BALDWINS
SALZGITTER
SOCIEDAD MIXTA SIDERURGIA ARGENTINA
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WESTFALENHUETTE
YAWATA IRON & STEEL
YOUNGSTOWN'S CAMPBELL WORKS

Such overwhelming preference—by wide ferrous hot strip mills—proves the essential soundness of **MORGOIL** design simplicity and manufacturing precision. Regardless of speed or load, this bearing has shown the outstanding record for dependability, long life and cost-saving performance in every area of operation. Backed by the foremost name in steel-making equipment, it is the acknowledged standard of an industry.

PARTIAL LIST OF INSTALLATIONS SINCE 1955

XMS

MORGAN WORCESTER

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

ROLLING MILLS • MORGOIL BEARINGS • WIRE DRAWING MACHINES • COMBUSTION CONTROLS

while increased buying by machinery builders, fabricators, and missile subcontractors is noted. But there's less buying by the shipyards and carbuilders.

Rails, Cars . . .

Track material Prices, Page 195

Fifty piggyback flatcars of low level design have been purchased from ACF Industries Inc., New York, by the North American Car Corp. at a cost of $600,000. The 89 ft cars will be built at the American Car & Foundry Div. and will go into lease service.

General American Transportation Corp. has booked an order for 120 aluminum tank cars to be built at its Masury, Ohio, car works beginning in November. The cars will cost an estimated $2,500,000 and are for Armour & Co. The 10,000 gallon cars, each insulated with 4 in. of Fiberglas, will carry liquid nitrogen fertilizer from Armour's plant at Cherokee, Ala.

August Steel Production Recovers from July Slump

Steel ingot production in August of 8,657,000 net tons was the second highest monthly output this year, being topped only by May's 8,980,626 tons, reports the American Iron & Steel Institute.

August was the fourth straight month that output exceeded 8 million tons. The month's total was up from the 8,091,958 tons reported for July, and was considerably above the 6,838,000 tons poured in August, 1960.

Output in the first eight months this year amounted to 61,607,618 net tons, off sharply from the 73,-943,019 tons produced in the same period last year.

The AISI index of steelmaking rose to 104.9 in August vs. 98.1 in July, 1961, and 82.9 in August, 1960. The index for the first eight months of this year stood at 95.3 vs. 113.9 in the like 1960 period.

Steel Ingot Production Rises, Although Slowly

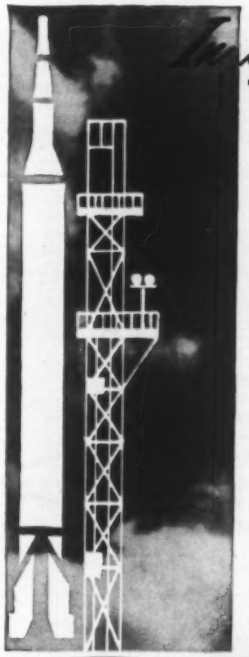
AUTOMOTIVE labor problems have braked the rise in steelmaking operations. The expected September surge in production has not materialized, but output continues to advance slowly. STEEL estimates output for the week ended Sept. 23 at 2,040,000 tons, a gain of 0.4 per cent over the preceding week's total.

● **Youngstown**—Operations rose 1 point to 67 per cent capacity for the week ended Sept. 23. Sharon Steel Corp. added one open hearth furnace at its Roemer Works, Farrell, Pa.

Steel Ingot Production—August, 1961

Period	Open Hearth (Net tons)	Bessemer (Net tons)	Basic Oxygen Process (Net tons)	Electric (b) (Net tons)	Totals (Net tons)	Index (a)
1961						
January	5,539,900	49,609	213,255	613,240	6,416,004	77.8
February	5,347,458	68,138	225,963	597,539	6,239,098	83.7
March	6,068,244	75,694	281,698	660,753	7,086,389	85.9
1st Quarter	16,955,602	193,441	720,916	1,871,532	19,741,491	82.4
April	6,551,518	65,503	269,991	697,675	7,584,687	95.0
May	7,743,927	79,758	342,251	814,690	8,980,626	108.9
June	7,375,876	85,494	323,589	766,897	8,551,856	107.1
2nd Quarter	21,671,321	230,755	935,831	2,279,262	25,117,169	103.7
1st Half	38,626,923	424,196	1,656,747	4,150,794	44,858,660	93.1
*July	7,131,419	78,585	254,245	627,709	8,091,958	98.1
†August	7,511,000	82,000	297,000	767,000	8,657,000	104.9
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	146.1
February	9,715,527	216,263	245,458	949,558	11,126,806	144.2
March	10,103,122	202,812	306,741	952,008	11,564,683	140.2
1st Quarter	30,329,265	630,207	833,180	2,948,241	34,740,893	143.4
April	8,603,306	105,336	302,763	766,452	9,777,857	122.5
May	7,844,140	73,010	309,505	603,817	8,830,472	107.0
June	6,441,594	80,344	314,766	568,169	7,404,873	92.7
2nd Quarter	22,889,040	258,690	927,034	1,938,438	26,013,202	107.4
1st Half	53,218,305	888,897	1,760,214	4,886,679	60,754,095	125.4
July	5,494,331	61,700	289,003	505,890	6,350,924	77.0
August	5,860,394	52,652	279,550	645,404	6,838,000	82.9
September	5,525,244	42,228	287,323	603,626	6,458,421	80.9
3rd Quarter	16,879,969	156,580	855,876	1,754,920	19,647,345	80.2
Nine Months	70,098,274	1,045,477	2,616,090	6,641,599	80,401,440	110.3
October	5,917,780	56,914	270,450	623,236	6,868,380	83.3
November	5,308,894	51,246	257,286	554,514	6,171,940	77.3
December	5,042,558	35,559	202,330	559,394	5,839,841	70.8
4th Quarter	16,269,232	143,719	730,066	1,737,144	18,880,161	77.1
2nd Half	33,149,201	300,299	1,585,942	3,492,064	38,527,506	78.7
Totals (1960)	86,367,506	1,189,196	3,346,156	8,378,743	99,281,601	101.9

*Revised. †Preliminary. (a) Index based on average production 1957-59 as 100. (b) Includes crucible steel. Data from American Iron & Steel Institute.



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Ulbrich stocks the following Special Metals for prompt delivery of your strip requirements.

Ulbrich can supply these special metals in all tempers, all edges, in coil or cut lengths, and finish, any weight from an ounce on up, with normal delivery of two weeks. Write for complete listing of all Ulbrich metals, maximum gauges and widths.

Inconel	(3)	PH 15-7 MO	(1)
Inconel X	(3)	AM 350	
Incoloy	(3)	AM 355	
Monel	(3)	19-9 DX	
Hastelloy C	(4)	19-9 DL	
Hastelloy X	(4)	A286	
L605 (Haynes #25)	(4)	Rene 41	(2)
Carpenter 20	(5)	"A" Nickel (electronic grade)	

(1) Reg. U.S. Pat. Off. Armco Steel Corp.
(2) Reg. Trade Mark of General Electric Co.
(3) Reg. Trade Mark of Int. Nickel Co.
(4) Reg. Trade Mark of Union Carbide and Carbon Corp.
(5) Reg. Trade Mark of Carpenter Steel Co.

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OCTOBER 23-27, BOOTH - 538

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• **Philadelphia**—Ingot production in the Northeast district showed little change during the week ended Sept. 23. In the preceding week, output eased 1 point in the AISI index to 114.

• **Pittsburgh**—Despite strikes at GM plants, steelmakers are continuing production here at the highest level of the year. Output for the week ended Sept. 23 was about 408,000 tons, equivalent to about 69 per cent of 1960 capacity.

• **Chicago** — Steelmaking for the week ended Sept. 23 was scheduled at an estimated 75 per cent of 1960 capacity, up 1 point from the previous week's rate.

• **Birmingham** — Ingot output for the week ended Sept. 23 is estimated at 72 per cent of 1960 capacity, unchanged from the previous week's rate. The disruption of activities in the Southwest by Hurricane Carla reduced steelmaking operations sharply during the week ended Sept. 16. A rapid recovery is expected.

• **Los Angeles**—The Western district operating rate advanced 3 points during the week ended Sept. 23 to an estimated 81 per cent of 1960 capacity.

Structural Shapes . . .

Structural Shape Prices, Page 190

Public work continues to feature demand in the fabricated structural steel market. Activity is lagging at some points, but sustained contracting is reported at others. Competition continues keen among fabricating shops.

Demand for wide flange beams is reported accelerating. Mill bookings for October are running ahead of September's. Since rollings are fuller, fewer sections are being scheduled per month. Result: Deliveries are lengthening.

Standard structural shapes are moving sluggishly; deliveries from the mills range two to four weeks.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3300 tons, office building, Union Central Life Insurance Co., Cincinnati, to International Steel Co., Evansville, Ind.; Frank Messer & Sons Inc., Cincinnati, general contractor.

2500 tons, paper board and powerplant, Federal Paperboard Co. Inc., Versailles, Conn., to Topper & Griggs Inc. (Bethlehem Fabricators Inc.), Hartford, Conn.; W. J. Megin Inc., Naugatuck, Conn., general contractor.

1582 tons, state bridge structures, Route 80, Sec. 5N, Bergen County, New Jersey, to City Iron Works, Hartford, Conn.; Franklin Contracting Co., general contractor.

970 tons, state bridgework, Cumberland County, Pennsylvania, through Reed & Kuhn, general contractor, to Cumberland Bridge Co., New Cumberland, Pa.

616 tons, cotton mill, Adams plant, Greenwood Mills Inc., Ninety-Six, S. C., to Owen Steel Co., Greenville, S. C.; Daniel Construction Co., Greenville, S. C., general contractor.

400 tons, Rare Book Library, Yale University, New Haven, Conn., to Ingalls Iron Works, Birmingham; George A. Fuller Co., Boston, general contractor.

395 tons, warehouse, Owens-Illinois Glass Co., Bridgeton, N. J., through Mahony-Troast Construction Co., general contractor, to Bethlehem Fabricators, Bethlehem, Pa.

300 tons, federal maximum security penitentiary, Marion, Ill., to Southwestern Engineering Co., Tulsa, Okla.; Blount Bros. Construction Co., Montgomery, Ala., general contractor.

250 tons, state bridgework, Bucks County, Pennsylvania, through S. J. Groves & Sons Co., Camp Hill, Pa., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

218 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia, to Carroll Steel Co., Woodbury, N. J.

211 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia, to Pines Steel Co., New York.

167 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia, to Knoxville Iron Co., Knoxville, Tenn.

130 tons, high school, Franklin, Mass., to Builders Iron Works, Somerville, Mass.; also, 42 tons of concrete reinforcing steel to Concrete Steel Co., Boston.

125 tons, building, Knouse Foods Corp., Chambersburg, Pa., through I. Reindollar & Son, general contractor, to Dauphin Steel & Engineering Co., Harrisburg, Pa.

STRUCTURAL STEEL PENDING

4000 tons, cargo terminal, warehouse facilities, Norfolk, Va., for Virginia Ports Authority, B. F. Diamond Co., Savannah, Ga., low on the general contract.

1715 tons, three Alaska State ferries; bids in at Juneau, Alaska.

1400 tons, state bridgework, Route 287, Sec. 3C, Middlesex County, New Jersey, bids Oct. 11; 535 tons of reinforcing steel also required.

1185 tons, Belvedere Interchange, Baltimore; Richard Nissley, Landsville, Pa., low on the general contract.

780 tons, Montana State, Missouri River bridge; bids to Helena, Mont., Sept. 27.

618 tons, state bridgework, Huntington-Blair Counties, Pennsylvania, bids Oct. 13; 203 tons of reinforcing bars also required.

286 tons, state bridgework, Montour County, Pennsylvania; bids Sept. 29.

250 tons, state bridgework, Indiana County, Pennsylvania, bids Sept. 29.

188 tons, three span, wide flange beam bridge, Shoreham, Vt.; bids Sept. 22, to Montpelier, Vt.; also required, 45 tons of concrete reinforcing bars.

178 tons, state highway bridge, Derby, Vt., 1-91-3 (5); Fabi & Fils Ltd., Sherbrook, Que., low on the general contract; also required, 65 tons of concrete reinforcing bars.

175 tons, state bridgework, Crawford County, Pennsylvania; bids Sept. 29.

175 tons, state bridgework, Northumberland-Montour Counties, Pennsylvania, bids Sept. 29.

143 tons, state bridgework, Monroe County, Pennsylvania, bids Oct. 13; 265 tons of

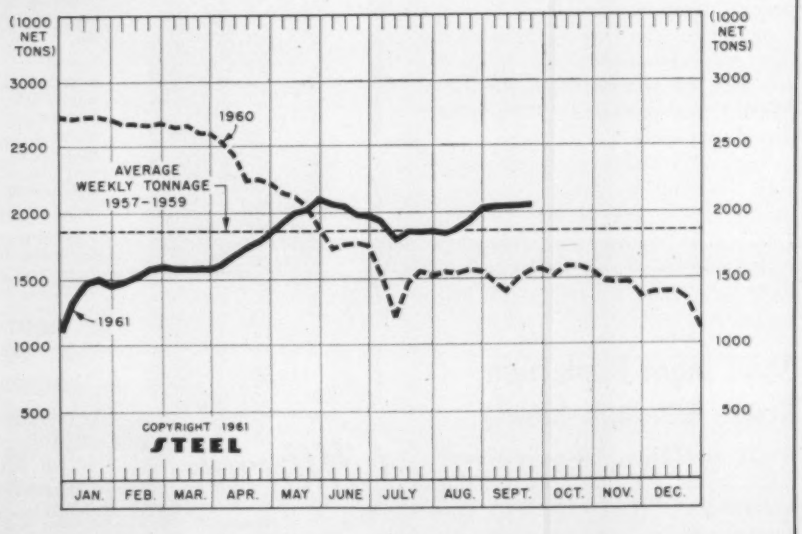
(Please turn to Page 199)

STEEL INGOT PRODUCTION

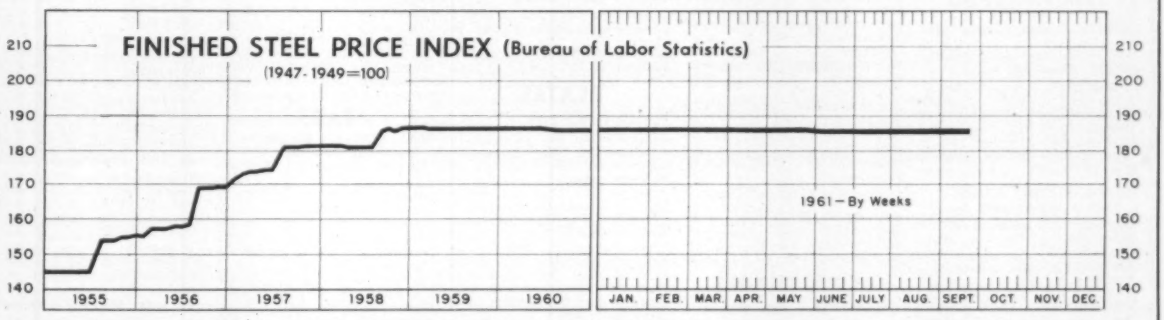
Weeks Ended	Net Tons	Change
Sept. 23	2,040,000*	+ 0.4%
Sept. 16	2,032,000	0
Sept. 9	2,032,000	+ 0.1%
Totals to Sept. 16		
1961	66,204,000	—13.7%
1960	76,696,000	

DISTRICT	Week Ended —Sept. 16— Tons‡	Index†	Week Ended Sept. 9 Index†
Northeastern	304,603	114	115
Buffalo	100,276	103	100
Pittsburgh	407,585	101	98
Youngstown	164,882	97	98
Cleveland	124,077	134	125
Detroit	150,031	143	136
Chicago	415,224	111	111
Cincinnati	85,208	113	122
St. Louis	48,872	93	101
Southern	96,472	89	108
Western	130,943	112	109
Industry	2,032,000	109.1	109.1

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Sept. 19, 1961	Week Ago	Month Ago	Aug. Index	Year Ago
185.6	185.6	185.6	185.6	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, H.R., Carbon	6.675
Rails, Light, 40 lb	7.292	Bars, Reinforcing	(N.A.)
Tie Plates	6.875	Bars, C.F., Carbon	10.710
Axles, Railway	10.175	Bars, C.F., Alloy	14.125
Wheels, Freight Car, 33 in. (per wheel)	62.000	Bars, C.F., Stainless, 302 (lb)	0.570
Plates, Carbon	6.350	Sheets, H.R., Carbon	6.350
Structural Shapes	6.167	Sheets, C.R., Carbon	7.300
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, Galvanized	8.775
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Carbon	9.225
Bars, H.R., Alloy	10.775	Strip, C.R., Stainless, 430 (lb)	0.460
Bars, H.R., Stainless, 303 (lb)	0.543	Strip, H.R., Carbon	6.250
		Pipe, Black, Buttweld (100 ft)	19.495
		Pipe, Galv., Buttweld (100 ft)	23.098
		Pipe Line (100 ft)	195.423
		Casing, Oil Well, Carbon (100 ft)	193.028
		Casing, Oil Well, Alloy (100 ft)	302.645
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	192.285
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (Bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.372
		Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Sept. 20 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	225.71
Index in cents per lb	6.713	6.713	6.713	6.713	6.114

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$137.75
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	62.63
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	62.18
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	63.41
Steelmaking Scrap, GT	39.83	39.83	38.33	32.00	59.67

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 20 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	5.075
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	5.075
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.85
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	5.00
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	5.00
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.85
Plates, Chicago	5.30	5.30	5.30	5.30	4.85
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	5.25
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.85
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.75-5.85
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	6.30
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.95
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	7.20
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	8.35
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$91.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.80

PIG IRON, Gross Ton	Sept. 20 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$63.50
Basic, Valley	66.00	66.00	66.00	66.00	62.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	59.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	66.70
Malleable, Valley	66.50	66.50	66.50	66.50	63.00
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$37.50	$37.50	$35.50	$30.50	$58.50
No. 1 Heavy Melt, E. Pa.	40.50	40.50	40.00	35.00	59.00
No. 1 Heavy Melt, Chicago	41.50	41.50	39.50	30.50	61.50
No. 1 Heavy Melt, Valley	42.50	42.50	39.50	31.50	65.50
No. 1 Heavy Melt, Cleve.	38.50	38.50	36.50	29.50	63.00
No. 1 Heavy Melt, Buffalo	32.50	31.50	31.50	29.50	56.50
Rails, Rerolling, Chicago	61.50	61.50	59.50	52.50	84.50
No. 1 Cast, Chicago	44.50	43.50	42.50	39.50	53.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.50
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	17.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	29.50

Steel Prices

Mill base prices reported to STEEL, Sept. 20, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 191; footnotes, page 195.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOT, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. C8 .....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2,T7 ....119.00
Conshohocken,Pa. A3 .121.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2 .119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ...119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. P5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ...6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 .6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
N.Tonawanda S47 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ...5.30
Aliquipa,Pa. J5 .....5.30
Ashland,Ky(15) A10 ...5.30
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1 .7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 .....6.05
Warren,O. R2 .....6.05

FLOOR PLATES

Cleveland J5 .....6.375
Claymont,Del. P4 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 .....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minneque,Colo. C10 ...6.125
Niles,Calif P1 .....6.375
N.Tonawanda S47 .....5.675
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
N.Tonawanda S47 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded (Including loaded extra) Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.10
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ...7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.16
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.25
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025

Hammond, Ind. J5, L2 ..9.025
Hartford, Conn. R2 ....9.325
Harvey, Ill. R5 .....9.025
Lackawanna, N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield, Mass. B5 ...9.325
Massillon, O. R2, R8 ...9.025
Midland, Pa. C18 .....9.025
Monaca, Pa. S17 .....9.025
Newark, N.J. W18 .....9.20
N. Tonawanda S47 ....9.025
Plymouth, Mich. P5 ...9.225
S. Chicago, Ill. W14 ....9.025
SpringCity, Pa. K3 .....9.20
Struthers, O. Y1 .....9.025
Warren, O. C17 .....9.025
Waukegan, Ill. A7 .....9.025
Willimantic, Conn. J5 ..9.325
Worcester, Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse, Mich. G5 .....5.675
Emeryville, Calif. J7 ...6.425
Fontana, Calif. K1 ....6.375
Ind. Harbor, Ind. Y1 ....5.675
Johnstown, Pa. B2 ....5.675
Joliet, Ill. P22 .....5.675
Kokomo, Ind. C16 .....5.775
Lackawanna, N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison, Ill. L1 .....5.475
Milton, Pa. M18 .....5.825
Minnequa, Colo. C10....6.125
Niles, Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 .....6.425
Seattle A24, B3, N14...6.425
S. Chicago, Ill. W14 ....5.675
S. SanFrancisco B3 ....6.425
SparrowsPoint, Md. B2..5.675
Steelton, Pa. B2 .....5.675
Sterling, Ill. (1) N15...5.675
Sterling, Ill. N15 .....5.775
Struthers, O. Y1 .....5.675
Tonawanda, N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown, Pa. B2 .....7.33
Lackawanna, N.Y. B2 ..7.35
Marion, O. P11 .....6.70
Newark, N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ...7.95
SparrowsPoint, Md. B2 ..7.33
St. Paul U8 .....8.17

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 16.10
Economy, Pa. (D.R.) B14 20.50
Econ. (DirectRolled) B14 13.55
Economy (Staybolt) B14 20.50
McK. Rks. (S.R.) L5 ...16.10
McK. Rks. (D.R.) L5 ...20.50
McK. Rks. (DirRolled) L5 13.55

BARS, Rail Steel

ChicagoHts. (3) C2, I-2 5.575
ChicagoHts. (4) (44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin, Pa. (3) F5 ...5.575
Franklin, Pa. (4) F5 ...5.675
JerseyShore, Pa. (3) J8 ..5.55
Marion, O. (3) P11 ....5.575
Tonawanda (3) B12 ....5.575
Tonawanda (4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity, Ala. R2 ...5.10
Allenport, Pa. P7 .....5.10
Aliquippa, Pa. J5 .....5.10
Ashland, Ky. (8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken, Pa. A3 ...5.15
Detroit (8) M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Fairless, Pa. U5 .....5.15
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 .....5.825
Gary, Ind. U5 .....5.10
Geneva, Utah C11 .....5.20
GraniteCity, Ill. (8) G4 ..5.20
Ind. Harbor, Ind. I-2, Y1 5.10
Irvin, Pa. U5 .....5.10
Lackawanna, N.Y. B2 ..5.10
Mansfield, O. E6 .....5.10
Munhall, Pa. U5 .....5.10
Newport, Ky A2 .....5.10
Niles, O. M21, S3 .....5.10
Pittsburg, Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth, O. P12 ....5.10
Riverdale, Ill. A1 .....5.10
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. U5, W14..5.10
SparrowsPoint, Md. B2...5.10
Steubenville, O. W10 ....5.10
Warren, O. R2 .....5.10
Weirton, W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles, O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary, Ind. U5 .....8.40
Ind. Harbor, Ind. Y1 ....8.40
Irvin, Pa. U5 .....8.40
Munhall, Pa. U5 .....8.40
Newport, Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....7.525
Ashland, Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.525
Fairfield, Ala. T2 .....7.525
Fairless, Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana, Calif. K1 .....8.25
Gary, Ind. U5 .....7.525
Ind. Harbor, Ind. I-2, Y1 7.525
Irvin, Pa. U5 .....7.525
Lackawanna (35) B2 ...7.525
Munhall, Pa. U5 .....7.525
Niles, O. S3 .....7.525
Pittsburgh J5 .....7.525
S. Chicago, Ill. U5, W14 7.525
Sharon, Pa. S3 .....7.525
SparrowsPoint (36) B2..7.525
Warren, O. R2 .....7.525
Weirton, W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10 ....5.35
Cleveland R2 .....5.875
Warren, O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown, O. A10 ....6.775
Warren, O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity, Ala. R2 ..6.275
Aliquippa, Pa. J5 .....6.275
Allenport, Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken, Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse, Mich. G5 .....6.275
Fairfield, Ala. T2 .....6.275
Fairless, Pa. U5 .....6.325
Follansbee, W.Va. F4 ..6.275
Fontana, Calif. K1 .....7.40
Gary, Ind. U5 .....6.275
GraniteCity, Ill. G4 ....6.375
Ind. Harbor, Ind. I-2, Y1 6.275
Irvin, Pa. U5 .....6.275
Lackawanna, N.Y. B2 ..6.275
Mansfield, O. E6 .....6.275
Middletown, O. A10 ....6.275
Newport, Ky. A2 .....6.275
Pittsburg, Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth, O. P12 ....6.275
SparrowsPoint, Md. B2..6.275
Steubenville, O. W10 ....6.275
Warren, O. R2 .....6.275
Weirton, W.Va. W6 ....6.275
Youngstown Y1.....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse, Mich. G5 .....9.275
Fairless, Pa. U5 .....9.325
Fontana, Calif. K1 .....10.40
Gary, Ind. U5 .....9.275
Ind. Harbor, Ind. I-2, Y1 9.275
Lackawanna (38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint (33) B2..9.275
Warren, O. R2 .....9.275
Weirton, W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala. City, Ala. R2	7.125	....
Ashland, Ky. A10	7.225	7.475
Canton, O. R2	7.125	....
Fairfield, Ala. T2	7.125	7.375
Gary, Ind. U5	7.125	7.375
GraniteCity, Ill. G4	7.225	....
Ind. Harbor I-2	7.225	7.425
Irvin, Pa. U5	7.125	7.375
Kokomo, Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts. Calif. C11	7.875	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind. Harbor, Ind. I-2 ....7.475

SHEETS, Enameling

Ashland, Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield, Ala. T2 .....6.775
Gary, Ind. U5 .....6.775
Ind. Harbor, Ind. I-2, Y1 6.775
Irvin, Pa. U5 .....6.775
Middletown, O. A10 ....6.775
Niles, O. M21, S3 .....6.775
SparrowsPoint, Md. B2..6.775
Youngstown Y1.....6.775

BLUED STOCK, 29 Gage

Dover, O. E6 .....8.70
Ind. Harbor, Ind. I-2 ....8.70
Mansfield, O. E6 .....8.70
Warren, O. R2 .....8.70
Yorkville, O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee, W.Va. W10 7.225
Gary, Ind. U5 .....7.225
Mansfield, O. E6 .....7.225
Middletown, O. A10 ....7.225
Niles, O. M21, S3 .....7.225
Warren, O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.625

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 9.525
Butler, Pa. A10 (type 2) 9.625
Irvin, Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana, Calif. K1 ....7.325
Geneva, Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin, Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt. (39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton, O. R2 .....7.175
Irvin, Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland, Ky. A10 .....7.125
Middletown, O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield, O. C3 .....7.50
Cleveland (28) R2 .....7.65
Niles, O. (28) R2 .....7.65
Weirton, W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity, Ala. R2 .6.875‡
Ashland, Ky. A10 .....6.875‡
Canton, O. R2 .....6.875‡
Dover, O. E6 .....6.875†
Fairfield, Ala. T2 .....6.875†
Gary, Ind. U5 .....6.875†
GraniteCity, Ill. G4 ...6.975*
Ind. H'rb'r, Ind. I-2, Y1 6.875†
Irvin, Pa. U5 .....6.875†
Kokomo, Ind. C16 .....6.975‡
MartinsFerry, O. W10..6.875*
Middletown, O. A10 ....6.875†
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt., Md. B2 ...6.875†
Warren, O. R2 .....6.875†
Weirton, W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Corp.

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala. (27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ...5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2,Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ...8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ...7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10.7.425
Fontana,Calif. K1 ....9.20
FranklinPark,Ill. T6 ..7.425
Ind.Harbor,Ind. Y1 ...7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10 7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 ....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ...15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ...10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ...7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7....7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Basis Weight 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Electrolytic 0.25 lb (100 lb basis wt) Coating

Aliquippa,Pa. J5 .....$9.10
Fairfield,Ala. T2 .....9.10
Fairless,Pa. U5 .....9.10
Fontana,Calif. K1 ....9.75
Gary,Ind. U5 .....9.10
GraniteCity,Ill. G4 ....9.20
Ind.Harb.,Ind. I-2, Y1 ..9.10
Irvin,Pa. U5 .....9.10
Niles,O. R2 .....9.10
Pittsburg,Calif. C11 ....9.75
SparrowsPt.,Md. B2 ....9.10
Weirton,W.Va. W6 ....9.10
Yorkville,O. W10 .....9.10

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.20
Fairless,Pa. U5 .....8.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1 8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

ELECTRO. TIN-COATED SHEET (20-27 gage; per 100 lb)

IndianaHarb.,Ind. Y1 ..$7.90

(21-27 gage; per 100 lb)

Aliquippa,Pa. J5 .....$7.90
Niles,O. R2 .....7.90

TIN PLATE, HOT DIPPED COMMON COKE

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

HOLLOWARE ENAMELING (Black plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ...7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875	11.70	12.40	13.55	14.65
Warren,O. R2	9.875	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. §Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ....8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
N.Tonawanda S47 .....8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00
N.Tonawanda S47 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 .....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 .12.65
KansasCity,Mo. U3 ....12.90
LosAngeles(2) B3 .....13.60
Minnequa,Colo. C10 ...12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 .....13.70
Pittsburg,Calif. C11 ....13.45
Portsmouth,O. P12 .....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.075
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.075
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.95
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 .....10.05
Pittsburg,Calif. C11 ....10.20
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.20
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7, J6..16.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 .....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ill. M8..16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ...16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 .....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6..16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

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Ever-vigilant sentinels against surprise attack are the radar installations along the DEW Line. Stretching 3,000 miles across Canada and Alaska, this electronic fence is our first line of defense.

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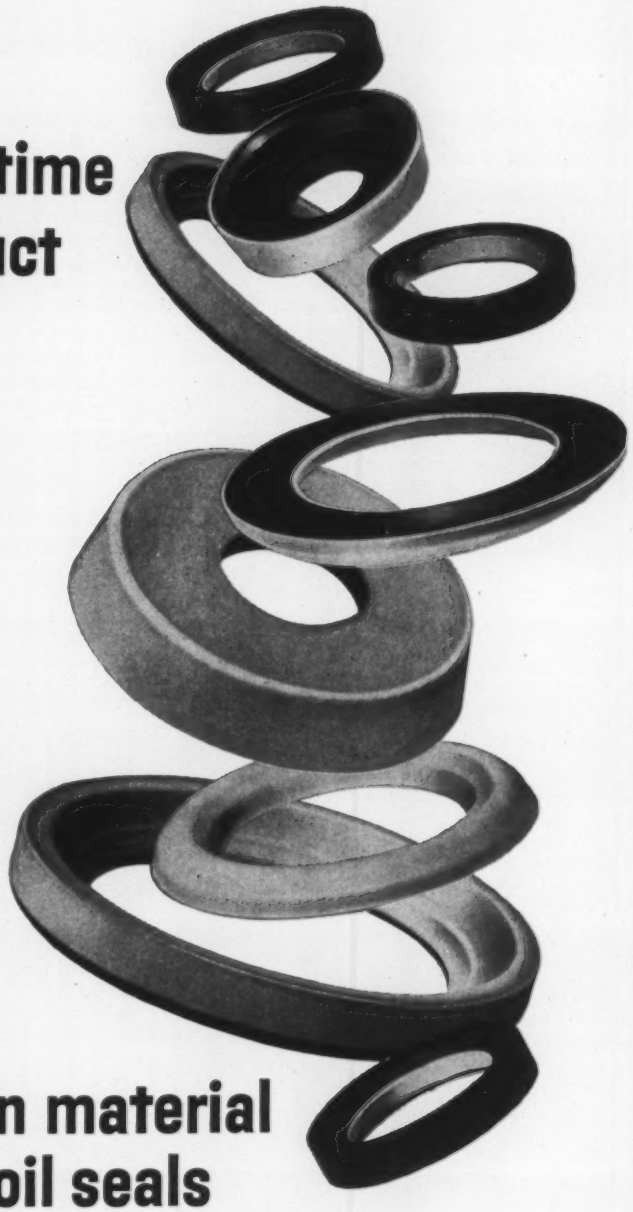

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INTERNATIONAL PACKINGS CORPORATION

Bristol, New Hampshire

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P-2

WIRE, Tire Bead

Bartonville,Ill. K4	....17.15
Monessen,Pa. P16	....17.15
Roebling,N.J. R5	.....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....12.35
Baltimore T6	.....12.65
Boston T6	.....12.65
Buffalo W12	.....12.35
Chicago W13	.....12.45
Cleveland A7	.....12.35
Crawfordsville,Ind. MS	.12.35
Dover,O. G6	.....12.35
Evanston,Ill. M22	....12.45
Farrell,Pa. S3	.....12.35
Fostoria,O. S1	.....12.35
FranklinPark,Ill. T6	..12.45
Kokomo,Ind. C16	....12.35
Massillon,O. R8	.....12.35
Milwaukee C23	.....12.55
Monessen,Pa. P7, P16	..12.35
NewCastle,Pa. M23	...12.35
Palmer,Mass. W12	....12.65
Pawtucket,R.I. N8	....12.65
Philadelphia P24	.....12.65
Riverdale,Ill. A1	.....12.45
Rome,N.Y. R6	.....12.35
Sharon,Pa. S3	.....12.35
Trenton,N.J. R5	.....12.65
Warren,O. B9	.....12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	...173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. MS	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. MS	...175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	...175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	...$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	..$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. MS	..177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. MS	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
Sparrows Pt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	..$8.78
Atlanta A11	.....10.36
Bartonville,Ill. K4	....8.88
Buffalo W12	.....10.26
Chicago W13	.....9.24
Crawfordsville,Ind. MS	..8.88
Donora,Pa. A7	.....8.78
Duluth A7	.....8.78
Fairfield,Ala. T2	.....8.78
Houston S5	.....9.02
Jacksonville,Fla. MS	..8.88
Johnstown,Pa. B2	.....8.78
Joliet,Ill. A7	.....8.78
KansasCity,Mo. S5	....9.02
Kokomo,Ind. C16	.....8.88
LosAngeles B3	.....9.20
Minnequa,Colo. C10	....8.02
Pittsburg,Calif. C11	....9.20
S.Chicago,Ill. R2	.....8.78
S.SanFrancisco C10	....9.20
SparrowsPt.,Md. B2	....8.88
Sterling,Ill.(37) N15	....8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	..$9.06
Atlanta A11	.....10.70
Bartonville,Ill. K4	.....9.16
Buffalo W12	.....10.60
Chicago W13	.....9.54
Crawfordsville,Ind. MS	..9.16
Donora,Pa. A7	.....9.06
Duluth A7	.....9.06
Fairfield,Ala. T2	.....9.06
Houston S5	.....9.30
Jacksonville,Fla. MS	..9.16
Johnstown,Pa. B2	.....9.06
Joliet,Ill. A7	.....9.06
KansasCity,Mo. S5	....9.30
Kokomo,Ind. C16	.....9.16
LosAngeles B3	.....9.50
Minnequa,Colo. C10	....9.30
Pittsburg,Calif. C11	....9.50
S.Chicago,Ill. R2	.....9.06
S.SanFrancisco C10	....9.50
SparrowsPt.,Md. B2	....9.16
Sterling,Ill.(37) N15	....9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	..$9.11
Atlanta A11	.....10.75
Bartonville,Ill. K4	.....9.21
Buffalo W12	.....10.65
Chicago W13	.....9.59
Crawfordsville,Ind. MS	..9.21
Donora,Pa. A7	.....9.11
Duluth A7	.....9.11
Fairfield,Ala. T2	.....9.11
Houston S5	.....9.35
Jacksonville,Fla. MS	..9.21
Johnstown,Pa. B2	.....9.11
Joliet,Ill. A7	.....9.11
KansasCity,Mo. S5	.....9.35
Kokomo,Ind. C16	.....9.21
LosAngeles B3	.....9.55
Minnequa,Colo. C10	....9.35
Pittsburg,Calif. C11	....9.55
S.Chicago,Ill. R2	.....9.11
S.SanFrancisco C10	....9.55
SparrowsPt.,Md. B2	....9.21
Sterling,Ill.(37) N15	....9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	...212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. MS	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. MS	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. MS	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. MS	198
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	....198**
Monessen,Pa. P7	.....196§
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	..17.85	19.65
Bartonville K4	..17.95	19.80
Chicago W13	....17.85	....
Cleveland A7	...17.85	....
Craw'sville MS	17.95	19.80‡‡
Fostoria,O. S1	..18.35	19.90†
Houston S5	....18.10	19.65**
Jacksonville MS	17.95	19.80‡‡
Johnstown B2	..17.85	19.65§
Kan.City,Mo. S5	..18.10	....
Kokomo C16	...17.95	19.50†
Minnequa C10	..18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt. B2	..17.95	19.75§
St'ling(37) N15	..17.95	19.80
Waukegan A7	..17.85	19.40†
Worcester A7	....18.15	....

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	..177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	...177

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	.....187**
Aliq'ppa,Pa.9-11½Ga.J5	190§
Atlanta A11	.....191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. MS	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. MS	192
Johnstown,Pa.(42) B2	.190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	...192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A1	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality

	6 to 8 gage	An'ld	Galv.
Ala.City,Ala. R2	..9.00	9.55**	
Aliquippa J5	....8.65	9.325§	
Atlanta(48) A11	..9.00	9.75*	
Bartonville(48) K4	9.10	9.85	
Buffalo W12	.....9.00	9.55†	
Chicago W13	....9.00	9.55**	
Cleveland A7	.....9.00	....	
CrawfordsvilleMS	9.10	9.80††	
Donora,Pa. A7	...9.00	9.55†	
Duluth A7	.....9.00	9.55†	
Fairfield T2	.....9.00	9.55	
Houston(48) S5	..9.25	9.80**	
Jack'vill.Fla. MS	9.10	9.80‡‡	
Johnstown(48) B2	9.00	9.675§	
Joliet,Ill. A7	.....9.00	9.55†	
KansasCity(48)S5	9.25	9.80**	
Kokomo(48) S16	..9.10	9.65†	
LosAngeles B3	..9.95	10.625§	
Minnequa C10	...9.25	9.80**	
Monessen(48) P7	..8.65	9.35§	
Palmer,Mass. W12	9.30	9.85†	
Pitts.,Calif. C11	..9.95	10.50†	
Rankin,Pa. A7	....9.00	9.55†	
S.Chicago R2	....9.00	9.55**	
S.SanFran. C10	..9.95	10.50**	
Spar'wsPt.(48)B2	9.10	9.775§	
St'ling(37)(48)N15	9.10	9.80	
Struthers,O. Y1	...9.00	9.65‡	
Worcester,Mass.A7	9.30	9.85†	

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

FASTENERS

SCREWS, NUTS, BOLTS

(Consumer discounts per cent off list prices, plain finishes. For less than full container quantities, add 25 per cent; attaching nuts to bolts in sizes ¼ in. through ⅝ in. diameter through 8 in. in length, price on application. Discounts are determined by the quantity of screws, nuts, and bolts ordered for one destination at one time.)

Base, one keg	..... 43.00
20,000 lb or more	.... 53.00

SCREWS, SETSCREWS

Hex Screws and High Strength Hex Screws, through 1 in. x 12 in.:	
Base, one keg	..... 43.00
20,000 lb or more	.. 53.00
Hex Screws 1⅛ in. diameter and larger: See net price schedule.	
Fillister Head Screws, coarse thread:	
Packages	.....+70.00
Bulk	.....+28.00
Flat Head Screws, coarse thread:	
Packages	.....+100.00
Bulk	.....+52.00
Setscrews, Square Head, Cup-point, coarse thread:	
Packages	.....+10.00
Bulk	..... 15.00

(Bulk discounts on fillister, flat head, and set screws apply only to products ordered in these minimum quantities: ¼ in. through ⅝ in. diameter, 15,000 pieces; ⅞ in. through ⅝ in. diameter, 5000 pieces; and ¾ in. through 1 in. diameter, 2000 pieces.)

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter; 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.725
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	.....6.875
Gary,Ind. U5	.....6.875
Lackawanna,N.Y. B2	..6.875
Minnequa,Colo. C10	...6.875
Seattle B3	.....7.025
Steelton,Pa. B2	.....6.875
Torrance,Calif. C11	...7.025

JOINT BARS

Bessemer,Pa. U5	.....7.25
Fairfield,Ala. T2	.....7.25
Joliet,Ill. U5	.....7.25
Lackawanna,N.Y. B2	...7.25
Minnequa,Colo. C10	....7.25
Steelton,Pa. B2	.....7.25

AXLES

Ind.Harbor,Ind. S13	...9.125
Johnstown,Pa. B2	.....9.125

SCREW SPIKES

Lebanon,Pa. B2	.....15.10

TRACK BOLTS, Untreated

Cleveland R2	.....15.35
KansasCity,Mo. S5	....15.35
Lebanon,Pa. B2	.....15.35
Minnequa,Colo. C10	...15.35
Pittsburgh S44	.....15.35
Seattle B3	.....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	....10.10
Lebanon,Pa. B2	.....10.10
Minnequa,Colo. C10	..10.10
Pittsburgh J5	.....10.10
Seattle B3	.....10.60
S.Chicago,Ill. R2	.....10.10
Struthers,O. Y1	.....10.10
Youngstown R2	.....10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		8c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
380	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	55.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Strip, Carbon Base —Cold Rolled— Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
No. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.13	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.18	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	10.50	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	9.28
Indianapolis	9.66	10.64	10.57	11.83	9.66	11.09	16.39	10.01	8.20	11.79
KansasCity	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.27	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	10.48	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	10.51	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	8.82	9.49	10.64	10.99	8.82	11.49	16.54	9.17	8.66	10.95
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Nario, Ohio, $87.50. Dolomite-Magnesite: Nario, Ohio, $109.50. Magnetite: Nario, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
Carbon (N.T.):

Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00

Wire Rods:

Carbon	5.70
Alloy	6.40

Wire (carload lots):

Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85

Bars & Small Shapes:

Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85§
40 mesh bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade. 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10	56.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5% below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe, except as noted.)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.55	$5.60	$5.50	$5.40	$5.70
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.75	5.80	5.70	5.60	5.90
I-Beams	5.75	5.90	5.80	5.70	6.00
Channels	5.75	5.90	5.80	5.70	6.00
Plates (basic bessemer)	5.65	5.70	5.60	5.50	5.80
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	23.66	23.72	23.59	23.31	25.04
Barbed Wire (†)	6.25	6.30	6.20	6.10	6.40
Merchant Bars	6.05	6.10	6.00	5.90	6.20
Hot-Rolled Bands	6.05	6.10	6.00	5.90	6.20
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	....	5.95	5.95	6.20
Wire Rods, O.H. (Sumitomo, Japan)	5.95	....	5.90	5.90	6.05
Bright Common Wire Nails (‡)	7.30	7.35	7.25	7.15	7.45

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates — nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	35.00-37.00†
Domestic Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked — $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

(Concluded from Page 188)

reinforcing bars also required.
125 tons, state bridgework, Fayette County, Pennsylvania, bids Sept. 29.
123 tons, bridges, Cold Brook and Capsuptic, Oxford County, Maine; bids Sept. 27 to Augusta, Maine.
Unstated, Oregon State highway projects: Morrow County overcrossing, R. A. Heintz and Rogers Construction Co., Portland, Oreg., joint low bidders at $78,090; Multnomah County, Williams Ave. grade separation, Portland, Oreg., Peter Kiewit Sons Co. Inc., Vancouver, Wash., low at $368,142.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1650 tons, federal maximum security penitentiary, Marion, Ill., to Jones & McKnight Steel Co., Mt. Vernon, Ill.; Blount Bros. Construction Co., Montgomery, Ala., general contractor.
350 tons, office building, Union Central Life Insurance Co., Cincinnati, to Joseph T. Ryerson & Sons Inc., Cincinnati; Frank Messer & Sons Inc., Cincinnati, general contractor.
392 tons, paper board mill and powerplant, Federal Paperboard Co. Inc., Versailles, Conn., to U. S. Steel Supply Div., Pittsburgh, U. S. Steel Corp.; W. J. Megin Inc., Naugatuck, Conn., general contractor.
345 tons, science building, University of Virginia, Charlottsville, Va., to Montague-Betts Co., Lynchburg, Va.; J. W. Daniel Construction Co. Inc., general contractor; also, 48 tons of structural steel to same supplier.
250 tons, biological research building, Brown University, Providence, R. I., to Plantations Steel Co., Providence; Dimeo Construction Co., Providence, general contractor.
225 tons, Idaho State highway project, Bannock County, to unstated interest; Jack B. Parson Construction Co., Southfield, Utah, general contractor.
210 tons, Washington State road project, Pierce County, to James D. English Steel Co., Tacoma, Wash.; Woodworth & Co., Tacoma, general contractor.
200 tons, addition, Neilson Library, Smith College, Northampton, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, general contractor; 60 tons of structural steel went to Standard Structural Steel Co., Hartford, Conn.
100 tons, two state highway bridges, Westport, Mass., to Northern Steel Inc., Boston; Coleman Bros. Corp., Readville, Mass., general contractor; superstructures of prestressed concrete.

REINFORCING BARS PENDING

7500 tons, also 40 tons of structurals, Washington State, Seattle section of freeway; Guy F. Atkinson, South San Francisco, general award at $7,944,493.
500 tons, Seattle parking facility; general contract to Howard S. Wright Construction Co., Seattle, at $1,339,000.
500 tons, also 260 tons of shapes, addition to Swedish Hospital, Seattle; bids advanced to Sept. 28.
355 tons, six Idaho State highway projects, Bonneville County; bids to Boise, Idaho, Oct. 3.
Unstated, women's dormitory, Gonzaga College, Spokane, Wash.; $1 million project; bids Sept. 26.
Unstated, seven concrete water reservoirs, pumps, etc.; bids to Idaho Falls, Idaho, Oct. 10.
Unstated, women's dormitory, Montana State University, Missoula; general contract to Pew Construction Co., Missoula, low at $707,000.
Unstated, bridge, Bureau of Public Roads, Glacier National Park, Montana; general contract to C. B. Lauch Construction Co., Great Falls, Mont., low at $208,302.
Unstated, Oregon road bids: Lane County, traffic structures, Stanley Witt, Corvallis, low at $536,748; 72 ft bridge, Pacific Construction Co., Portland, Oreg., low at $56,333; bridge, B.&M. Construction Co., Portland, Oreg., low at $58,607; Lincoln County, 245 ft Siletz River bridge, Wilder & Kenworthy, Portland, Oreg., low at $105,540.

PLATES . . .

PLATES PLACED

12,385 tons, 12¾ and 14 in. OD, Wharf Board of Commissioners, New Orleans, to Stupp Corp., Baton Rouge, La., projects 6012 and 6014.
140 tons, grade HY-80, Navy Purchasing Office, Washington, to U. S. Steel Corp., Pittsburgh.
100 tons, water storage tank, Snoqualmie, Wash., to Chicago Bridge & Iron Co., Seattle, low at $43,090.

PLATES PENDING

3500 tons, three Alaska State ferries; Puget Sound Bridge & Dry Dock Co., Seattle, low at $10,445,000 to Department of Public Works, Juneau, Alaska.
534 tons, carbon, Type 11, Class 1, Military Industrial Supply Agency, Navy, Philadelphia; bids Sept. 28; also, 587 tons of carbon sheets, bids Oct. 2.
450 tons, water supply line, 38 in.; bids to Port Townsend, Wash., Sept. 19.
450 tons, four harbor tugs, steel hull, Navy Department; bids about Oct. 6, Washington.
220 tons, high tensile hull plates, Military Industrial Supply Agency, Navy, Philadelphia; bids Sept. 26; also required, 95 tons of alloy steel plates, bids same date.

PIPE . . .

CAST IRON PIPE PLACED

197 tons, 6, 8, 10, and 12 in. for King County District No. 99, Seattle, to Pacific States Cast Iron Pipe Co., Seattle.
140 tons, 10 in., for Bellingham, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

350 tons, Ft. Lewis, Wash., Capehart housing, original bids Sept. 5 rejected; new bids to be called in October.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Missouri Pacific, 50 diesel locomotives, to Electro Motive Div., La Grange, Ill., General Motors Corp.

RAILROAD CARS PLACED

Chicago Great Western, 10, seventy ton covered hopper cars and 5, seventy ton flatcars, to General American Transportation Corp., Chicago.
New York Central, 50 flatcars, to Greenville Steel Car Co., Greenville, Pa.
Northern Pacific, 20, seventy ton covered hopper cars to General American Transportation Corp., Chicago.
Western Pacific, 40, seventy ton boxcars to Thrall Car Mfg. Co., Chicago Heights, Ill.; 10, one hundred ton, covered hopper cars to American Car & Foundry Div., ACF Industries, New York, and 3, seventy ton covered hopper cars to General American Transportation Corp., Chicago.
Florida East Coast, 22 flatcars to Pullman-Standard Div., Pullman Inc., Chicago.

RAILROAD CARS PENDING

Soo Line, 95 miscellaneous freight cars, including 40, fifty ton boxcars; expenditure for purchase authorized by the directors.

Iron Ore Statistics—July, 1961

Iron Ore in Inventory—July, 1961

(From all sources, gross tons)

	U. S. Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
At U. S. Furnaces						
Start of month	28,785,213	3,261,020	1,302,451	3,178,904	16,601,370	53,128,958
End of Month:						
Mass., N. Y.	2,464,311	15,176	137,037	153,441	276,547	3,046,512
Pennsylvania	6,248,557	397,297	19,162	83,418	8,143,987	14,892,421
Md., Va., W. Va.	612,990	10,361	.....	1,354,517	2,460,067	4,437,935
Ky., Tenn., Tex.	314,216	157,636	.....	261,366	70,167	803,385
Alabama	871	1,678,797	.....	103,171	3,522,797	5,305,636
Ohio	8,351,760	19,756	685,181	1,523,335	1,225,600	11,805,632
Indiana	7,199,133	28,579	419,477	.....	40,596	7,687,785
Illinois	4,275,346	46,075	32,485	.....	225,779	4,579,685
Mich., Minn.	3,246,134	.....	281,329	32,450	293,360	3,853,273
Colo., Utah, Calif.	.....	865,263	.....	.....	10,992	876,255
Undistributed	397	2,371	.....	.....	854	3,622
Total	32,713,715	3,221,311	1,574,671	3,511,698	16,270,746	57,292,141
At U. S. Docks	2,508,387	.....	215,327	842,165	2,389,719	5,955,598
Total U. S. Stocks	35,222,102	3,221,311	1,789,998	4,353,863	18,660,465	63,247,739
At Canada furnaces	2,194,048	.....	157,443	275,607	66,839	2,693,937
Total stocks						
U. S. & Canada	37,416,150	3,221,311	1,947,441	4,629,470	18,727,304	65,941,676

Consumption of Iron Ore—July, 1961

(Ore from all sources, gross tons)

	U. S. Ores		Canadian Ores		Foreign	
	L. Sup.	Other	L. Sup.	Other	Ores	Total
Use in U. S.:						
Mass., N. Y.	401,295	31,421	31,706	17,756	39,454	521,632
Pennsylvania	847,183	250,716	2,402	36,251	663,714	1,800,266
Md., Va., W. Va.	105,852	16,472	.....	307,018	353,901	783,243
Ky., Tenn., Tex.	49,360	81,802	.....	47,616	40,671	219,449
Alabama	.....	367,696	.....	4,802	194,425	566,923
Ohio	1,011,173	7,438	70,219	125,431	140,628	1,354,889
Indiana	1,146,454	.....	111,661	45	12,084	1,270,244
Illinois	625,345	34,303	12,904	.....	34,595	707,147
Mich., Minn.	476,139	.....	67,765	22,087	38,389	604,380
Colo., Utah, Calif.	.....	689,279	.....	.....	.....	689,279
Undistributed	47	39	.....	.....	112	198
In U. S.						
Blast furnaces	3,076,373	995,120	161,621	210,506	488,954	4,932,574
Steel furnaces	139,875	60,241	24,945	17,838	383,937	626,836
Sintering	1,446,537	423,805	110,091	332,662	644,983	2,958,078
Miscellaneous	63	.....	.....	.....	99	162
Total U. S.	4,662,848	1,479,166	296,657	561,006	1,517,973	8,517,650
In Canada:						
Blast furnaces	271,489	.....	103,339	107,336	.....	482,164
Steel furnaces	.....	.....	.....	31,983	9,426	41,409
Sintering	80,499	.....	16,130	42,708	.....	139,332
Total Canada	351,988	.....	119,469	182,022	9,426	662,905
U. S. & Canada	5,014,836	1,479,166	416,126	743,028	1,527,399	9,180,555

Data from the American Iron Ore Association.

THE AMPLEXOLOGIST

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The part shown is a magnet body for an electromagnetic clutch. Because of the required magnetic properties, uniform wall density is highly critical. Previously, therefore, it was necessary to machine the entire part. The Amplexologist, however, designed it to be produced as a finished, precision powder metal part which requires no machining; and through advanced density control held specified magnetic properties, even in the counterbore. *Approximate saving, 94%.*

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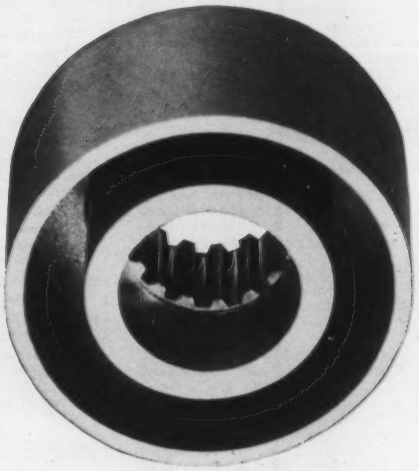
DETROIT 31, MICHIGAN
OILITE



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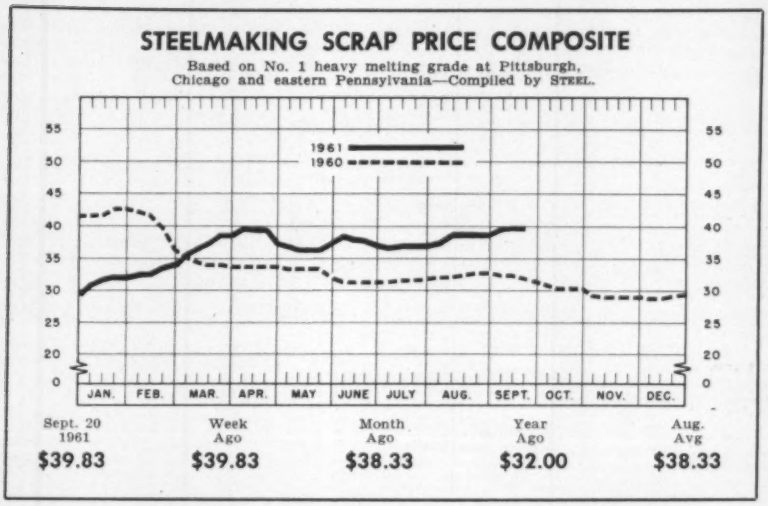

Scrap Price Advance Is Stalled

Upswing halted as STEEL's composite on No. 1 heavy melting grade holds at $39.83. Demand lags, but rising steel rate encourages trade hopes for early pickup in buying

Scrap Prices, Page 202

● **Cleveland** — The flow of scrap from some automotive plants has been cut by strikes. It means that September tonnages may fall short of expectations. So far, however, the steel mills haven't indicated any increased interest in building scrap inventories, probably because reactivated blast furnaces assure adequate hot metal supplies to support current steelmaking operations. Scrap prices are holding, and not much price action is expected until bids are opened on monthend auto lists.

● **Philadelphia**—Prices are strong, but with two exceptions, they're unchanged. Low phos higher at $45-$46; so is heavy breakable cast at $42. General strength in the market is due to prospects of higher steel production and a fairly sustained movement of export tonnage over the next several weeks.

● **New York** — Brokers have advanced their buying prices on heavy breakable cast scrap $1 a ton to $32-$33. Prices on other grades are unchanged but continue strong.

● **Boston**—Steel scrap prices are slightly firmer in New England. The bulk of the tonnage moving is for export. Only small tonnage is being taken by domestic mills. Japanese demand is heaviest in the export market. The scrap melt in New England is averaging about 40,000 tons monthly.

● **Pittsburgh** — Steelmaking operations are at 69 per cent of 1960 capacity, highest level of the year, but major scrap consumers aren't buying. GM's Fisher Body Div. closed for three weeks by a strike probably won't have an October scrap list. It hasn't been able to deliver the No. 1 factory bundles it sold for September. No. 2 bundles are quoted $2 a ton higher on a recent sale.

● **Chicago** — Open hearth scrap prices are holding virtually unchanged in a light buying market, but electric furnace material, foundry grades, and railroad scrap are stronger by $1-$2 a ton.

● **Detroit**—The market appears to be a little easier, but prices are unchanged. Dealers are marking time, pending bids on monthend auto lists.

● **Buffalo**—Prices on the leading grades of open hearth scrap advanced $1 a ton on sales for shipment out of the district. Buffalo area mills are still out of the market, but it's said they'll have to pay $32-$33 for No. 1 heavy melting tonnage.

● **Cincinnati** — The market is steady. Further price advances are anticipated as the steelmaking rate continues to rise. One area mill has not yet entered the market for September tonnage.

● **St. Louis**—The market continues strong. Scrapmen don't anticipate much higher prices, but they think present levels will hold for some time. Railroad scrap prices jumped last week; random length rails went up $5 to $46 a ton, rerolling rails $1 to $57, rails (18 in. and under) $1 to $46, and railroad specialties $2 to $44.

● **Birmingham** — Local dealers report prices on some grades advanced $1-$2 a ton last week, including No. 1 busheling at $40-$41, electric furnace bundles $40-$41, structurals and plate $44-$45.

● **Houston**—Except for storm-battered coastal areas, scrap shipments were back to normal within a week after Carla passed. The Sheffield steel mill, closest major producer to the storm's path, escaped heavy damage. Export loadings and ship movements were stalled. Some Texas ports may not return to normal operation for weeks. Port operations here are back to normal.

● **Los Angeles**—Demand from domestic mills is not as strong as had been expected, and dealers are expecting a price break of $2-$3 a ton unless both domestic and export buying picks up.

● **Seattle**—Prices are up $1 to $2 a ton on active export demand and increased domestic buying. Supplies of some of the better grades of material are limited, a factor contributing to price strength. No. 1 heavy melting at $49, No. 2 heavy melting at $45, and No. 2 bundles at $35 are at the highest levels in months.

Iron Ore . . .

Iron Ore Prices, Page 198

On Sept. 15, 142 lake ore carriers were in commission—down one from the 143 vessels operating on Aug. 15. The same number of ships was in service Sept. 15, 1960. Of total avail-

(*Please turn to Page 207*)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Sept. 20, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 20	$39.83
Sept. 13	39.83
Aug. Avg.	38.33
Sept. 1960	32.00
Sept. 1956	59.08

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	29.00-30.00
No. 1 dealer bundles	38.00-39.00
No. 2 bundles	*27.00-28.00*
No. 1 busheling	37.00-38.00
No. 1 factory bundles	47.00-48.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	43.00-44.00
3 ft and under	40.00-41.00
Heavy turnings	*29.00-30.00*
Punchings & plate scrap	*45.00-46.00*
Electric furnace bundles	44.00-45.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	47.00-48.00§

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 2 ft and under	53.00-54.00
Rails, 18 in. and under	54.00-55.00
Random rails	45.00-46.00
Angles, splice bars	45.00-46.00
Railroad specialties	48.00-49.00
Rails, reolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	41.00-43.00
No. 1 hvy melt., dealer	40.00-41.00
No. 2 hvy melting	36.00-37.00
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	*25.00-26.00*
No. 1 busheling, indus.	41.00-43.00
No. 1 busheling, dealer	40.00-41.00
Machine shop turnings	19.00-20.00
Mixed borings, turnings	21.00-22.00
Shovel turnings	21.00-22.00
Cast iron borings	21.00-22.00
Cut structurals, 3 ft	*47.00-48.00*
Punchings & plate scrap	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Stove plate	*39.00-40.00*
Unstripped motor blocks	*35.00-36.00*
Clean auto cast	*49.00-50.00*
Drop broken machinery	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
R.R. malleable	*49.00-50.00*
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Angles, splice bars	47.00-48.00
Axles	58.00-59.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles, solids	190.00-195.00
18-8 turnings	110.00-115.00
430 bundles & solids	95.00-100.00
430 turnings	55.00-60.00

BUFFALO

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	26.00-27.00
No. 1 bundles	*32.00-33.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	*32.00-33.00*
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	*40.00-41.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	*43.00-44.00*
Rails, 3 ft and under	*49.00-50.00*
Railroad specialties	*42.00-43.00*
Rails, rerolling	64.00-65.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	42.00-43.00
No. 1 bundles	38.00-39.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	38.00-39.00
Machine shop turnings	15.00-16.00
Shovel turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut foundry steel	36.00-37.00
Cut structurals, plate, 2 ft and under	43.00-44.00
Low phos. punchings & plate	39.00-40.00
Alloy free, short shovel turnings	20.00-21.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	44.00-45.00
Railroad specialties	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	50.00-51.00
Rails, 2 ft and under	50.00-51.00
Rails, random lengths	47.00-48.00
Rails, 18 in. and under	52.00-53.00
Cast steel	43.00-44.00
No. 1 railroad cast	49.00-50.00
Railroad specialties	46.00-47.00
Angles, splice bars	46.00-47.00
Rails, rerolling	57.00-58.00

Stainless Steel Scrap
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	165.00-170.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	42.00-43.00
No. 1 bundles	42.00-43.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	17.00-18.00
Shovel turnings	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	43.00-44.00
Electric furnace bundles	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling	35.00-36.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	12.00-13.00
Shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos., 18 in.	40.00-41.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	30.00-31.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 18 in. and under	48.00-49.00
Rails, random lengths	42.00-43.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Mixed cast	31.00-32.00
Stove plate	28.00-29.00
Heavy breakable	27.00-28.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00

PHILADELPHIA

No. 1 heavy melting	40.00-41.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	43.00-44.00
No. 2 bundles	26.00-27.00
No. 1 busheling	43.00
Electric furnace bundles	45.00
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	*45.00-46.00*
Couplers, springs, wheels	45.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	*42.00*
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	*32.00-33.00*

Stainless Steel

18-8 sheets, clips, solids	160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	31.00
No. 1 bundles	36.00
No. 2 bundles	26.00
No. 1 busheling	36.00
Machine shop turnings	16.50
Shovel turnings	18.50

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00
Rails, random lengths	*46.00*
Rails, rerolling	*57.00*
Rails, 18 in. and under	*46.00*
Railroad specialties	*44.00*
Angles, splice bars	40.00†

BIRMINGHAM

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	30.00-31.00
No. 1 bundles	39.00-40.00
No. 2 bundles	22.00-23.00
No. 1 busheling	*40.00-41.00*
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	44.00-45.00
Structurals & plate	*44.00-45.00*
Electric furnace bundles	*40.00-41.00*
Electric furnace:	
3 ft and under	*38.00-39.00*
2 ft and under	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, rerolling	51.00-52.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	42.00-43.00
Angles, splice bars	43.00-44.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
Machine shop turnings	12.50-13.00
Crushed turnings	17.00
Low phos. plate & structurals:	
3 ft	41.00-42.00
2 ft and under	47.00-48.00

Cast Iron Grades

No. 1 cupola	41.50-42.50
Heavy breakable	25.00-26.00
Foundry malleable	29.00-30.00
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	40.00-41.00

LOS ANGELES

No. 1 heavy melting	43.00-45.00
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*42.00*
No. 2 bundles	*30.00*
No. 2 bundles (export)	*31.00*
Machine shop turnings	20.00
Shovel turnings	20.00
Cast iron borings	17.00-18.00
Electric furnace scrap	50.00-52.00

Cast Iron Grades

No. 1 cupola	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-45.00

PORTLAND, OREG.
(Prepared, f.o.b. car)

No. 1 heavy melting	*49.00*
No. 2 heavy melting	*45.00*
No. 2 bundles	*35.00*
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	*49.00*
No. 1 hvy (unprepared)	*44.00*
No. 2 heavy melting	*45.00*
No. 2 hvy (unprepared)	*40.00*
No. 2 bundles	*35.00*
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	38.00
Stove plate (f.o.b. plant)	36.00
Unstripped motor blocks	37.00

SAN FRANCISCO

No. 1 heavy melting	43.00**
No. 2 heavy melting	40.00**
No. 1 bundles	34.00**
No. 2 bundles	29.00**
Machine shop turnings	16.00-18.00
Mixed borings, turnings	16.00-18.00
Cast iron borings	16.00-18.00
Heavy turnings	16.00-18.00
Shovel turnings	16.00-18.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	30.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	30.00
Unprepared	24.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

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GARDNER - DENVER

Copper Sales Hefty, but Not Profits

Nonferrous Metal Prices, Pages 206 & 207

THE COPPER industry has bounced back from the recession faster than any other major nonferrous metal.

Unless fourth quarter business slumps miserably, U. S. copper deliveries to fabricators will approach 1.4 million tons for the best mark since 1956. In that year, producer shipments totaled 1,466,000 tons. Last year, deliveries were down to 1,279,745 tons.

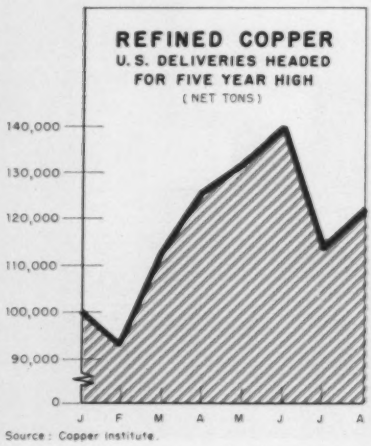
Yet, surprisingly, the improved business has stirred hardly a ripple of excitement in the copper market. Even more perplexing is where all this copper is going. This has been a year of solid recovery, but no boom period. Some major copper consumers, like the auto industry, are having only so-so sales.

• **Deliveries Misleading** — The explanation seems to be that deliveries are exceeding consumption in 1961. It's true the brass and wire mills are enjoying substantially better business. But most coppermen suspect substantial inventory rebuilding has been going on during the year, from fabricator to end consumer. Most copper users entered 1961 with extremely low stocks. As business has improved they've replenished them. Some buying has probably also taken place as a hedge against the strikes and political unrest in major copper producing countries.

The extent of inventory rebuilding is unknown. So is the question of how it will affect sales. September deliveries will probably be down, reflecting the recent strikes in the U. S. and Chile. Metalmen are reluctant to forecast fourth quarter sales—most look for pretty fair business with perhaps some slump late in the quarter.

• **Profitless Prosperity** — Another reason why higher sales aren't causing more excitement in copper circles is that they aren't reflected in profits. During most of 1960, the domestic copper price averaged about 33 cents a pound. This year, the price was at 29 cents until early May and then went up to 31 cents, where it has stayed. Costs are higher too. Result: Most copper company earnings are down.

Unlike copper sales in the U. S., sales abroad have been easing. Observers feel the boom in Europe and Japan may be fading a bit. It's likely 1961 copper deliveries outside the U. S. will wind up about on a par with last year's 2,021,969 tons.



• **Supply Good**—There's plenty of copper around, but no overabundance. World producers have been pretty successful this year in closely balancing supply with demand. They've been helped by labor unrest in different parts of the world that has cut into production from time to time. Overseas producers' stocks stand at 329,735 tons, those of the U. S., at 95,117 tons.

• **Prices Steady** — Barring a major disruption in production, which doesn't seem likely, you can look for the copper price to hold at 31 cents a pound over the rest of 1961.

Will Tin Be Released?

Congress doesn't have much time left to act on the administration's request to authorize sales of 50,000 long tons of tin from the U. S. stockpile. The House, at least, is shooting for adjournment before the end of the month. At press time, the tin disposal legislation was still in the Armed Services Committees of both houses. The administration is asking that the six months waiting period requirement on materials authorized for sale from stockpile be waived in the case of 10,000 tons of this tin. Rep. Carl Vinson (D., Ga.), chairman of the House Armed Services Committee, has introduced such legislation.

Aluminum Output Up

Primary aluminum production hit its highest point of the year in August as potlines turned out 167,040 tons. STEEL estimates the industry will produce a little more than 1.9 million tons this year compared with the record 2,014,498 tons in 1960.

No Lead-Zinc Bill in '61

The Senate has probably ended chances for any lead-zinc legislation in 1961. After a lot of political wrangling, a something-for-everyone compromise plan has been referred to the Finance Committee where it appears to be pigeonholed. The House earlier had passed the Edmondson Bill (subsidies for small producers) by 18 votes and forwarded it to the Senate for action. But the Senate tacked the Edmondson Bill onto legislation calling for increased lead-zinc tariffs. This combined bill is the one now dying in the Finance Committee. Even if the Senate bill could be cleared before adjournment, it's unlikely President Kennedy would sign it.

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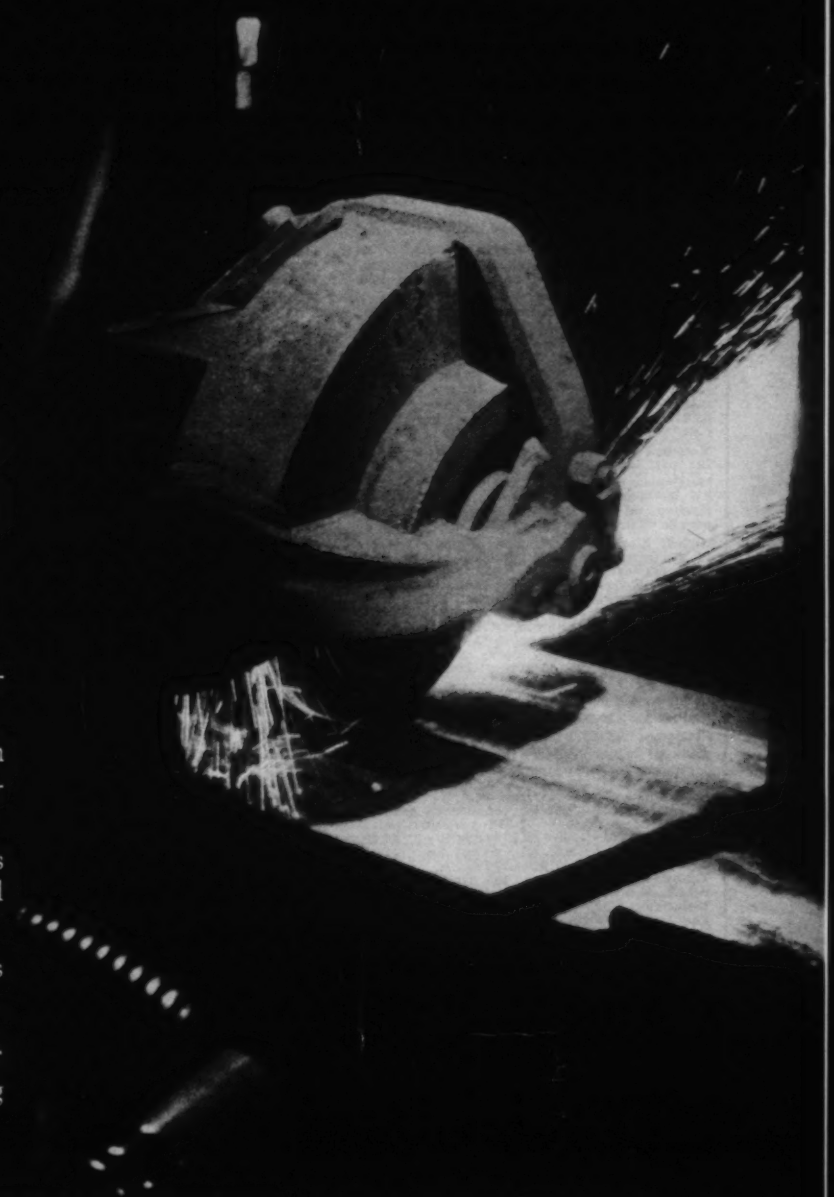

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $85 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $40 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pig, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l, 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l, 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 120.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max), $1.37 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7.25-7.75 per lb; 100-500 lb, $6.75-7.25 per lb; 500-1000 lb, $6.25-6.75; over 1000 lb, $6.25 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00; No. 12 foundry alloy (No. 2 grade), 21.25; 5% silicon alloy, 0.60 Cu max, 23.00; 13 alloy, 0.60 Cu max, 23.00; 195 alloy, 24.25; 108 alloy, 21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.50.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $5.70-15.50; sheared mill plate, $4.45-9.00; wire, $5.00-9.50; forging billets, $3.00-4.75; hot-rolled and forged bars, $3.39-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $11.00-16.00; H.R. strip, $11.00-15.00; C.R. strip, $13.00-18.00; forged or H.R. bars, $11.00-15.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R. .	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.183	24-72	72-180	45.40-48.00
0.183-0.154	24-72	72-180	45.40-48.00
0.154-0.120	24-72	72-180	45.90-48.80
0.120-0.096	24-72	72-180	45.90-48.80
0.096-0.076	24-72	72-180	46.40-50.30
0.076-0.060	24-72	72-180	46.90-51.10
0.060-0.047	24-72	72-180	47.40-52.30
0.047-0.037	24-72	72-180	47.90-53.70
0.037-0.030	24-72	72-180	48.40-55.30
0.030-0.023	24-60	72-180	48.90-57.10
0.023-0.018	24-48	72-144	49.40-57.40
0.018-0.014	24-48	72-144	51.20-58.00
0.014-0.011	24-48	72-144	53.50-60.00
0.011-0.0085	24-36	72-96	56.20
0.0085-0.007	24-36	72-96	59.20
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates: 1100, 3003, and 5005, mill finish, 0, H12, and H14 tempers, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
3.000-2.000	6-144	72-240	46.10-51.00
2.000-1.251	6-144	72-240	46.50-51.30
1.251-0.751	6-144	72-240	45.50-50.60
0.751-0.250	6-144	72-240	45.50-50.60

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Rounds, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in.,103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. width; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.50-25.00; No. 2 heavy copper and wire, 22.50-23.00; light copper, 19.75-20.25; No. 1 composition red brass, 22.00-22.50; No. 1

BRASS MILL PRICES

(Copper or Copper Alloy No.)	MILL PRODUCTS a Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES d (Based on copper at 31.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper (110)	56.13b	50.36-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass (268, 270)..	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80% (240)..	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85% (230) ..	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90% (220)	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze (675)	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal (365)	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass (464)	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze (651)	61.39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10% (745)	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5% (510)	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 21.00-21.50; new brass clippings, 18.25-18.75; light brass, 15.25-15.75; heavy yellow brass, 16.25-16.75; new brass rod ends, 17.25-17.75; auto radiators, unsweated, 18.25-18.75; cocks and faucets, 18.25-18.75; brass pipe, 18.50-19.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00 rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 4.00-4.50; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 25.75; light copper, 23.50; refinery brass (60% copper) dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 25.75; light copper, 23.50; No. 1 composition borings, 24.00; No. 1 composition solids, 24.50; heavy yellow brass solids, 18.50; yellow brass turnings, 17.50; radiators, 20.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 139.50; 200-499 lb, 138.00; 500-999 lb, 137.50; 1000 lb or more, 137.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 88.70; 100-600 lb, 79.00; 700-1900 lb, 76.30; 2000-9900 lb, 74.40; 10,000 lb or more, 73.10.

Stannous Chloride (Anhydrous): 100 lb, 147.80; 400 lb, 137.80; 800-19,900 lb, 116.50; 20,000 lb or more, 112.30.

Stannous Sulphate: Less than 50 lb, 155.10; 50 lb, 125.10; 100-1900 lb, 123.10; 2000 lb or more, 121.10.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 201*)

able trip capacity of 2,774,725 tons, 67.62 per cent (2,046,600 tons) is presently engaged. That compares with 67.77 per cent in August and 61.47 per cent in September, 1960.

Pig Iron . . .

Pig Iron Prices, Page 197

Demand for merchant pig iron is slow, but prospects for September point to a slight pickup over August bookings. Most sellers look for further improvement in October.

Youngstown Sheet & Tube Co. is expected to blow out one of its blast furnaces at the Campbell (Ohio) Works for relining. The company will blow in one of the smaller furnaces at Brier Hill Works, Youngstown.

Hanna Furnace Corp. has blown in a second blast furnace at its Buffalo plant. Reason: Improved demand for merchant iron.

Woodward Iron Co. relit a third blast furnace to replenish supplies of merchant pig iron.

Distributors . . .

Prices, Page 197

Service center operators anticipate a little pickup in business this month. Volume is running behind earlier expectations, partly because of automotive labor trouble.

Competition in stainless sheets continues to be rugged. A lack of price stability is the depressing factor in many districts. In most cases, service charges are waived or shaded. Imported and surplus stocks are weakening factors in some districts.

Some increase in replacement buying of warehouse stocks is noted with price hedging a minor influence.

Tin Plate . . .

Tin Plate Prices, Page 192

Beer cans made of tin plate but featuring aluminum ends are being used in the Oxnard-Santa Barbara and Eureka areas of California, and in the Reno, Nev., region by Burgermeister Brewing Corp., San Francisco.

CLASSIFIED ADVERTISING

Accounts Wanted

ACCOUNT WANTED

FORMER PRESIDENT of heavy equipment manufacturer and general manager of one of its divisions wants to represent maker of heavy castings or machinery. Pittsburgh and Eastern Ohio preferred. Wide sales acquaintance throughout steel industry. Semiretired and healthy but bored. Write Box 963, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

WANTED — ASSISTANT SUPERINTENDENT blast furnace operation. Young well established completely integrated steel company located in great southwest area needs to fill key position in its blast furnace department with well qualified man age limit 45 years. Company currently engaged in multi-million dollar expansion program. Excellent opportunity. Submit complete resume giving personal history, education, experience and salary requirements. All replies held confidential. Box 961, STEEL, Penton Bldg., Cleveland 13, Ohio.

EXPERIENCED ROLL TURNER to turn merchant bar mill rolls. Reply Box 960, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

YOUNG MAN, 32, B.S. SEVEN YEARS INDUSTRIAL SALES EXPERIENCE, (BONDED ABRASIVES). PAST FOUR AS DISTRICT MANAGER. INTERESTED IN GREATER OPPORTUNITY FOR ADVANCEMENT. BOX 964, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

Machinery and Equipment Wanted

WANTED: STRAIGHTENER

Five-roll Pipe and Tubing Straightener with 8⅝" OD or larger capacity. Please furnish complete specifications, including make, model and serial number.

O. F. MALY
VALLEY STEEL PRODUCTS CO.
Louisiana, Mo.
Phone: SKyline 4-4542

Opportunities

SALE OR LEASE

No. N. J. 6300 sq. ft. 1 story 13 ft. ceiling height, oil heat, over ½ acre, 234 ft. along RR., former heavy sheet metal shop.

Geo. Anton
128 Ward St. **Paterson 1, N. J.**

WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind.

Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry. When you have an opportunity to offer, use the Help Wanted columns of STEEL.

Which pre-paint phosphate coating is best for you?

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS

Undercoat of Oakite CRYSCOAT adds to the looks and life of finishes

From toys to tractors, painted metal products look better and last longer with Oakite CrysCoat under the paint.

CrysCoating—the conversion of a steel surface to a phosphate surface—creates a perfect base for paint adhesion. Paint goes on in a smooth, serviceable coat. Once on, it stays on.

At the same time, a CrysCoated surface prevents the formation of rust . . . even prevents rust spreading from a deep scratch. Both metal and paint are safeguarded. The product looks better, lasts longer.

Oakite has a CrysCoat process to fit every requirement—for iron phosphate or zinc phosphate coatings, for spray washer or for tanks. Is your particular problem one of economy? Durability? Production bottle-neck? For a helpful answer, ask your local Oakite man. Or write for details to Oakite Products, Inc., 26H Rector Street, New York 6, N. Y.

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OAKITE

over 50 Est. 1909 SCIENCE

years' leadership in industrial cleaning

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AIRCOMATIC® welding is the lower cost way to fabricate. Weldments show excellent ductility, tensile, and impact properties. Tailored to the process, Airco's wide range of Aircomatic stainless wires can be used for welding all standard alloy types. Remember: Only Airco makes everything you need for stainless welding.

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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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THE WHELAND FOUNDRY

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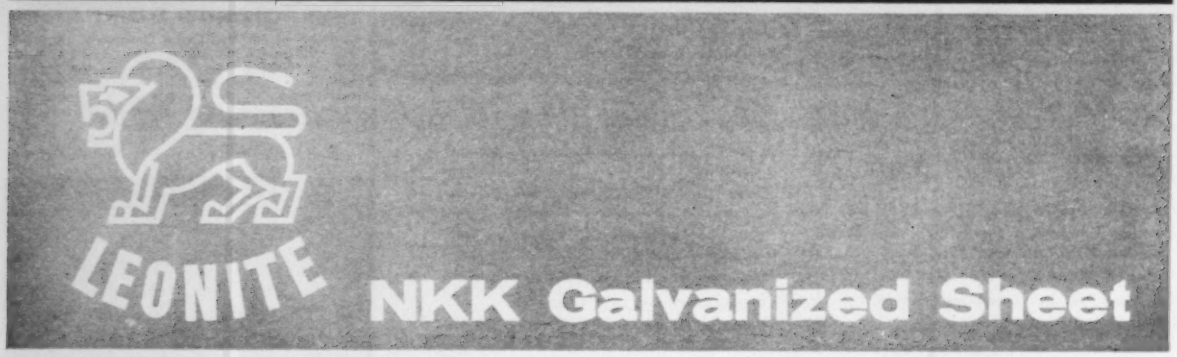

LEONITE is the highest quality NKK galvanized steel sheets, produced by Nippon Kokan's up-to-date Sendzimir-type continuous galvanizing mill, which boasts an extra-long annealing furnace. LEONITE is supplied in all gages and grades specified under various universally accepted standards or according to customers' requirements. Used as stock for roofing, walling, structural members, building material, household appliances and utensils, Leonite finds way into manufactured products of many kinds.

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(Japan Steel & Tube Corporation)

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Cable Address: STEELTUBE TOKYO, KOKANSHIP TOKYO
New York Office: Rm. 1115, 39 Broadway, New York 6, N.Y., U.S.A.
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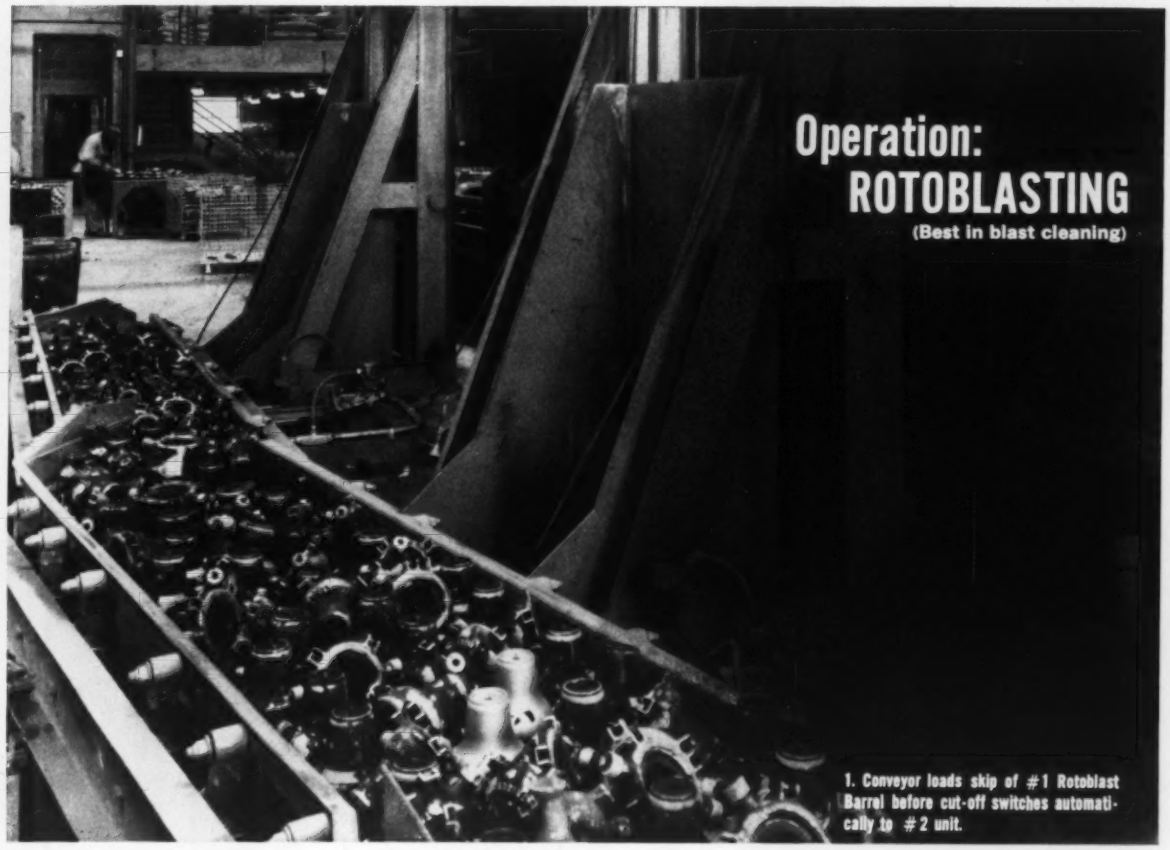


Operation: ROTOBLASTING

(Best in blast cleaning)

1. Conveyor loads skip of #1 Rotoblast Barrel before cut-off switches automatically to #2 unit.

Complete automation in blast cleaning!

Pangborn Rotoblast removes heavy sand cores and cleans up to 45,000 castings per shift at Neptune Meter!

A new and *completely automatic* Rotoblast operation not only cleans castings in half the time, but a new special separation removes heavy sand cores as well at Neptune Meter Co., Long Island City. The world's largest exclusive manufacturer of meters for liquids, Neptune can now handle 45,000 castings from the molds each shift . . . with just two automated Rotoblast Barrels.

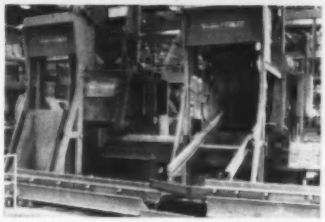
No costly or time-consuming manual lifting, toting or weighing here! Once the button is pressed, the Rotoblast sequence starts and recycles automatically until stopped at the end of the shift!

Whether your installation features automation or batch cleaning, Rotoblast cleaning efficiency can cut *your* operating and manpower costs. Flexibility of installation, ease of maintenance, durable construction—all contribute to lower overall cleaning costs.

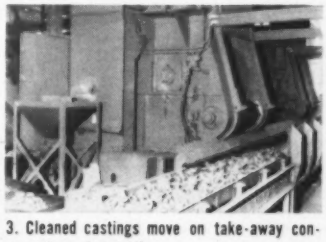
Write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md., Pangborn Canada, Ltd., 47 Shaft Road, Toronto (Rexdale), Canada; or phone district office in Yellow Pages, "Sand Blast Equipment." *Manufacturers of Blast Cleaning, Vibratory Finishing, Dust and Fume Control Equipment—Rotoblast® Steel Shot and Grit®.*

Pangborn

OF HAGERSTOWN



2. Skip fills second unit with exact pre-determined load for cleaning.



3. Cleaned castings move on take-away conveyor to next operation.

4. Before and after Rotoblasting. Note core sand and rods in uncleaned piece.

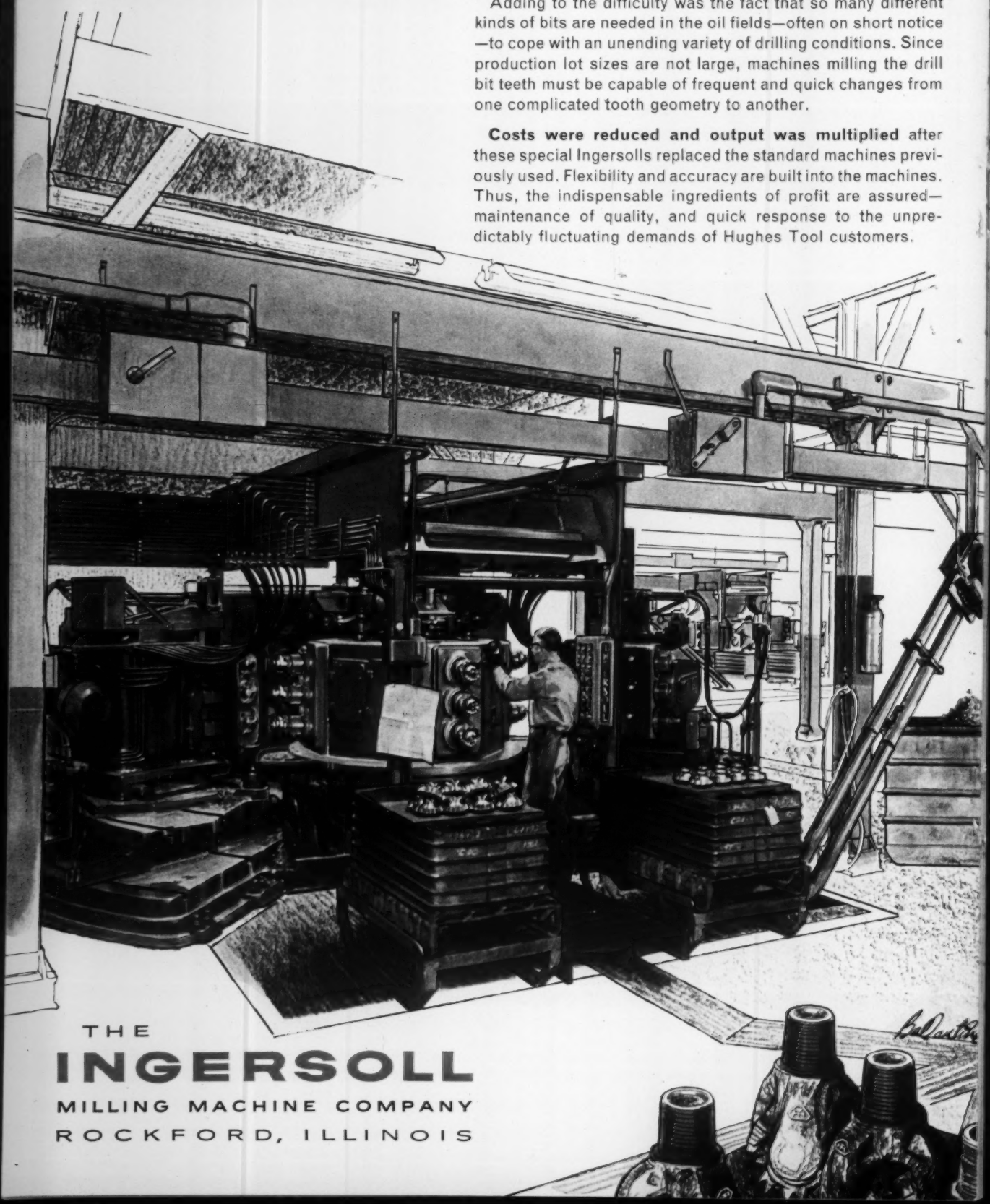
IN MANY WAYS, *IN MANY PLACES . . .*

special Ingersolls help to reduce costs, increase profits.

At Hughes Tool Company, the job of machining oil well drilling bits quickly and economically seemed extremely difficult before Ingersoll built the first of 10 complex automatic machines like this one for their Houston plant.

Adding to the difficulty was the fact that so many different kinds of bits are needed in the oil fields—often on short notice—to cope with an unending variety of drilling conditions. Since production lot sizes are not large, machines milling the drill bit teeth must be capable of frequent and quick changes from one complicated tooth geometry to another.

Costs were reduced and output was multiplied after these special Ingersolls replaced the standard machines previously used. Flexibility and accuracy are built into the machines. Thus, the indispensable ingredients of profit are assured—maintenance of quality, and quick response to the unpredictably fluctuating demands of Hughes Tool customers.



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